The Farm

QUARTERLY

WINTER 1951 • PRICE 50 CENTS

Studebaker ¾-ton 8-foot pick-up—½-ton 6½-foot and 1-ton 8-foot also availa

a lot of money this truck could save you!

gas! Spend less for repairs!
ay every day! Get the pulling
g power, the earning power of
udebaker truck!
–under all kinds of driving
can always count on a Stude-
p down your operating costs.
e Studebaker engineers use
ense in designing these trucks.
sisting ruggedness in every
ut no superfluous dead weight
der your gasoline needlessly!

Thrifty overdrive available, too

At your beck and call for still bigger savings is Studebaker's gas-saving, engine-saving overdrive.

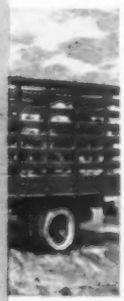
Overdrive is available at extra cost in any Studebaker half-ton or three-quarter ton truck —starts paying its way right away in extra thrift.

Make arrangements to get your share of the long-lasting, long-range operating economies that a new Studebaker truck can assure you.

Stop in at a nearby Studebaker dealer's showroom the very first opportunity you have.

STUDEBAKER TRUCKS

Noted for low-cost operation



ck just right
r most farm
2 ton models.
ck engines—
Econ-o-miser
wer-Plus.

Snug warmth inside the roomy Studebaker cab is assured by the unique Studebaker Truck Climatizer. Available at extra cost, it heats, ventilates, and defrosts—keeps the air fresh, even with the windows and built-in window wings tightly closed.

Low cab floor and enclosed safety steps —automatic "hold-open" door stops and tight-gripping rotary door latches, too. Two arm rests and sun visors. Dual windshield wipers. Metal-lined doors and dash compartment. Automatic door-switch cab light.

The extra safety of extra visibility is a Studebaker feature that drivers like. "Lift-the-hood" accessibility to engine, ignition, instrument panel wiring simplifies servicing, also.

© The Studebaker Corp'n, South Bend 27, Indiana, U. S. A.

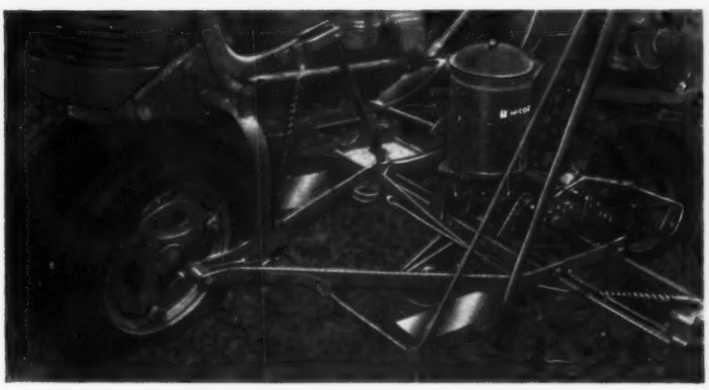
You can farm the way YOU want to—all the time

You want to boss every plowing job. You can! The Farmall C tractor-mounted plow runs at the depth you set it for—*all* the time. That's because long beams, hitched well forward, give natural draft lines. A fingertip touch on a Touch-Control lever changes the draft line to regulate plowing depth. Move the other hydraulic lever to lift or lower the two bottoms at headlands.

You want full power for every job. The balanced design of a Farmall C gives you top-notch performance with either trail-behind or mounted equipment. The 2,745 pounds of the Farmall C are properly distributed over the 81⅛-inch wheelbase. You pull heavier loads on the drawbar—handle direct-connected implements easier, with less gas-consuming horsepower.

...with a 2-plow McCormick*FARMALL*C

*McCormick and Farmall are separately registered trademarks of International Harvester Company



You want to grow more corn in every row. With the McCormick 2-row clutchless planter, you can plant the exact number of kernels you need to match the top fertility level *of every acre*. And more, you can check-plant, hill-drop, or drill. Accurate at high speeds, this forward-mounted planter leaves the drawbar of your Farmall clear to pull trailing implements between plantings.

You want to keep fields clean. With 22½-inch clearance, 7½-foot turning radius, and big 54-inch rear wheels that adjust for regular two-row cultivation without removing from the straight-line axle, you get in that last, important, high-crop cultivation—without damage to the crop. With the spring coil, hydraulic, padded seat, you enjoy smooth cross-row cultivating. You look *ahead* at your work.

AND McCormick equipment to fit your farm

See your IH dealer. Get the whole story about the Farmall C—the 2-plow tractor with the most features—with matched McCormick equipment. See the Farmall C—discover for yourself why Farmalls are "First in the Field."

INTERNATIONAL HARVESTER

International Harvester Builds McCormick Farm Equipment and Farmall Tractors . . . Motor Trucks . . . Crawler Tractors and Power Units . . . Refrigerators and Freezers

SEND FOR FREE BOOKLETS

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P. O. Box 7333, Dept. G, Chicago 80, Illinois

Send me the catalog about the Farmall and McCormick equipment that fit my farm. I farm _____ acres.

Name _____

Address _____

My IH dealer is _____

"In my 'Rocket' Oldsmobile"

Oh, the go-ing's great in the "88", It's a dri-ver's dream come true!

All new Oldsmobiles now have the famous "Rocket" Engine! Hydra-Matic Drive optional at extra cost

"ROCKET" HYDRA-MATIC "88" OLDSMOBILE

A General Motors Value

One of These TWO Is The Tire For YOU!

Firestone CHAMPION

CURVED BAR OPEN CENTER

FAMOUS PATENTED TRACTION CENTER

THE tractor tire you want is the one that will do the best job in the soil conditions on your farm. If it's an Open Center Tire you need, Firestone has it. . . . If it's a Traction Center, Firestone has that, too. Only Firestone builds both.

The new and advanced Firestone Curved Bar Open Center is the only tire made with Traction-Arc Bars, tapered and curved for better cleaning and a sharper, stronger hold in the soil.

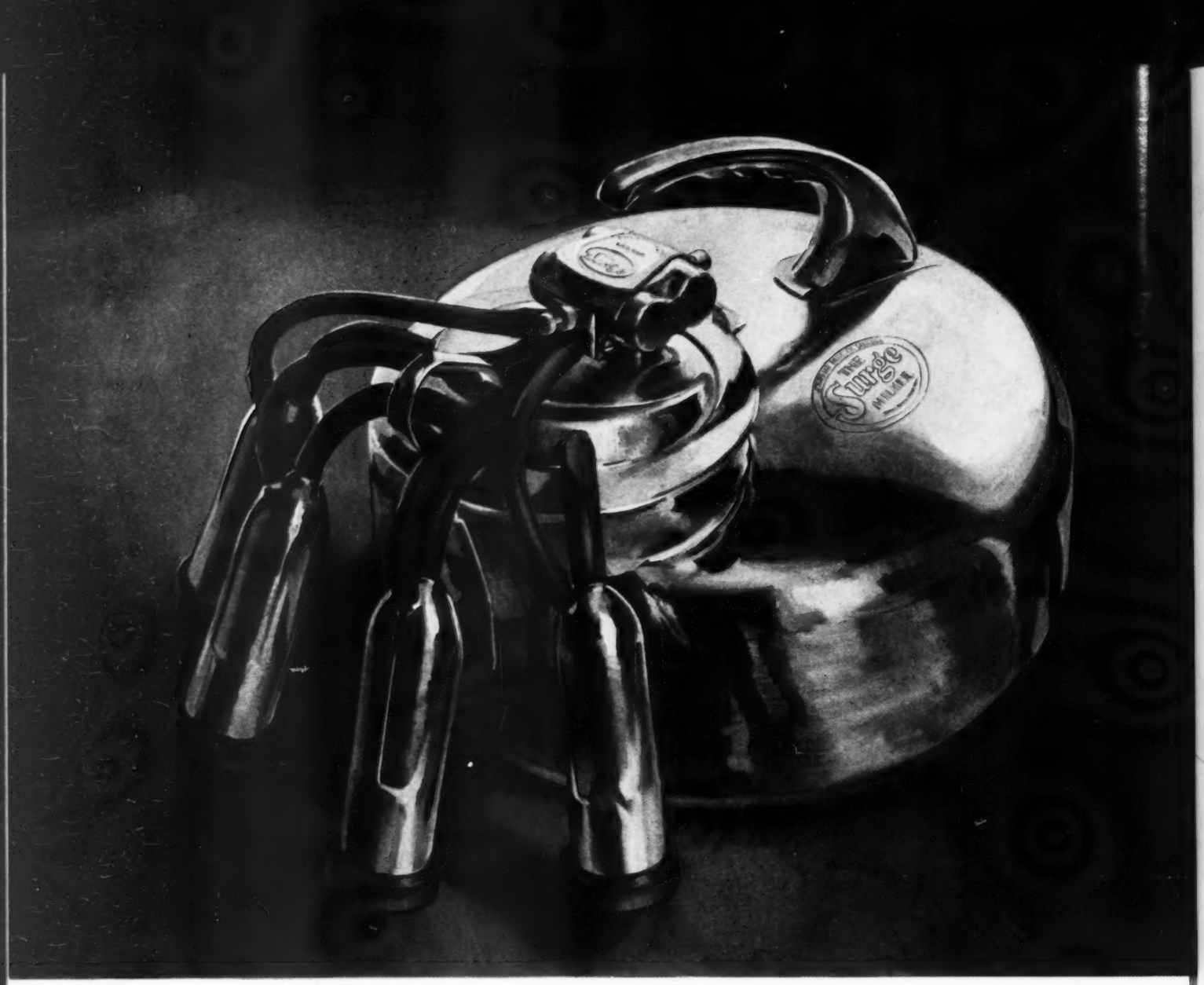
If you are like a million other farmers who prefer a Traction Center Tire, then the patented Firestone Champion Traction Center is the tire for you. It's the only Traction Center Tire.

Remember, you don't need to shop around. Your Firestone Dealer or Firestone Store has both the Curved Bar Open Center Champion and the patented Traction Center Champion.

Listen to the Voice of Firestone on radio or television every Monday evening over NBC

Copyright, 1950, The Firestone Tire & Rubber Co.

. . . Always buy tractor tires built by Firestone, originator of the first practical pneumatic tractor tire



GENUINE SURGE TUG AND PULL...

Down through the years increasing thousands of men have become convinced that no calf, no man, and no machine can do a real job of milking cows without Genuine Surge Tug and Pull.

That's why, year after year, so many thousands have switched to Surge.

Built under one or more of the following patents:
1,945,386 2,050,356
2,412,197 2,425,901
2,463,920 2,464,920
2,464,917. Other patents pending.
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Milk with Genuine Surge Tug & Pull

BABSON BROS. CO.

2843 W. 19th Street, Chicago 23, Illinois

SYRACUSE • HOUSTON • EL MONTE (CALIF.) • KANSAS CITY • TORONTO • ATLANTA • SEATTLE • MINNEAPOLIS

COMING IN SPRING

One of the marvels of farming is how the Norwegians can wrest a living from the inhospitable mountains of their native land. Here on the mountain farms, which become a sort of no man's land during the summer, Norwegian women carry on a profitable dairying and cheese-making industry while their men are away in the fishing fleets and the lumber camps. Jane Latta, who spent the summer on a Norwegian "saeter" tells the story for *FARM* readers in the Spring issue.

Three years of preparation have gone into our Spring story on garden tractors. The story will include photographs and specifications of all the leading garden tractors. Another story of the same type will describe the development of milking machines and list the leading makes now on the market.

A buyer who has bought hundreds of farms for satisfied customers tells what to look for and what to shun in buying a farm. Recent developments in hog cholera treatment and how serum and vaccine are made, leads the farm stock articles. Crop articles will include a list of catch crops and their management, crop insurance and its use, and a feature on modern cattle rustling, which is not at all a lost art in the West.

Can you learn about chickens by studying the pecking order in the flock? Scientists have been investigating this interesting hypothesis and their findings appear in our Spring issue. The skunk, his place on the farm and his very novel defense mechanism, will be the subject of a humor-packed article by a well known naturalist.

Five years ago *THE FARM* published its first story on hay drying in the mow. The Spring issue will bring this up to date and will describe all the latest methods of drying loose, baled, and chopped hay with and without heat. There will be a report of that perennial mystery, the origin of corn. Fences, all kinds and in all parts of the country, with suggestions on building and costs, will be another valuable article.

The place of the farm manager and farm management services in the American farm scene will be covered in a detailed article; both advantages and disadvantages will be frankly discussed. For topping there will be another rural painting by Alberta Strauss, the "Sunday School Dress." There will be a picture section of Spring scenes in color. All told, our coming issue is the kind of permanently valuable book that you will want to thumb through for kicks—then digest slowly during hours of pleasant and highly profitable reading.

THE FARM QUARTERLY
22 East 12th St., Cincinnati 10, Ohio

R. J. McGinnis.....**Editor**
Fred Knoop.....**Executive Editor**
Grant Cannon.....**Managing Editor**
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Contributing Editors: **Myron S. Hazen, G. N. Hoffer, Charles Krutch, C. M. Long, George D. Scarseth, Katharine A. Smith.**

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Successful

IN 9* OUT OF 10 CASES OF MASTITIS

Be *sure* when you treat mastitis! Use Squibb Penicillin Ointment—the ointment which has effected a high percentage of recoveries in treating *millions of cases of mastitis** over the past two years.

These are the reasons for the success of this penicillin ointment:

- Thorough dispersion throughout entire treated quarter, reaching the infection no matter where it may be in the quarter.
- Attacks mastitis* organisms over a period of from 48 to 72 hours—without interfering with regular milking.
- Usually, only one tube is necessary for successful treatment.
- Stops milk check losses by getting infected cows quickly back to full production of salable milk.
- Stable, non-toxic, non-irritating.
- Clear ointment—won't discolor milk.
- Easy to use. Improved tip on "Instant-Use" tube inserts easily into teat. Ointment flows readily from tube into infected quarter. Treatment is a matter of seconds. No syringe required.

Squibb "Instant-Use" Penicillin is sold through drug stores only. Ask your druggist for it. It's inexpensive! Keep this *proved* ointment always on hand in the barn ready for instant use. Treat mastitis at the first sign—stop its spread—save yourself many dollars. Write for folder on MASTITIS. E. R. Squibb & Sons, Veterinary & Animal Feeding Products Division, Dept. FQ-30, 745 Fifth Avenue, New York, N. Y.

For accurate diagnosis, consult your veterinarian

The reason is:

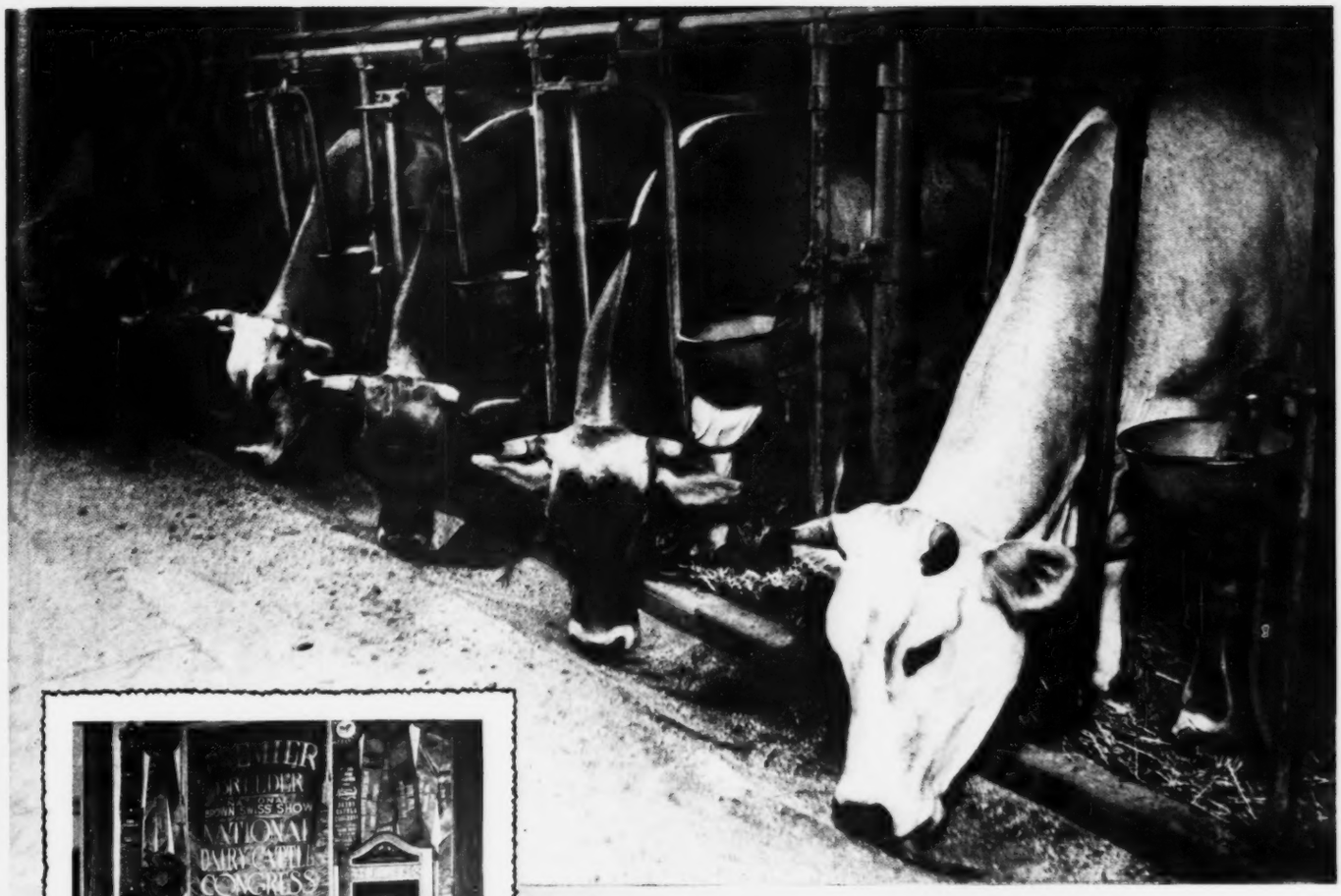
THOROUGH PENICILLIN DISPERSION

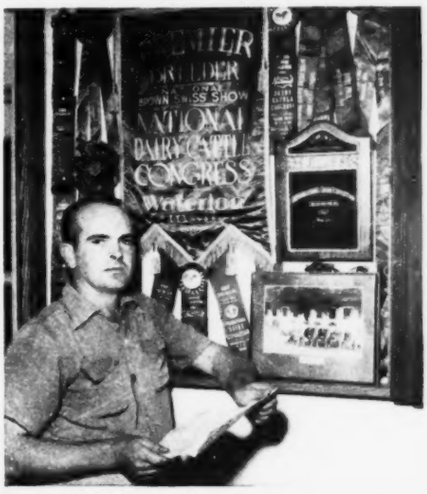
with prolonged action up to 72 hours!

Note, in the cross-section photograph above, how Squibb Ointment disperses penicillin throughout a treated quarter. One tube of Squibb Ointment, containing a dye instead of penicillin, was instilled into one quarter of a cow's udder. The cow was killed 17 hours later—the udder removed and frozen—and the photograph taken.

* due to *Streptococcus agalactiae*, the cause of the largest percentage of all mastitis cases.

SQUIBB - A NAME YOU CAN TRUS





Vernon C. Hull, Manager of Lee's Hill Farm, Morristown, New Jersey, with some of the awards won by his Brown Swiss herd.

These records from Lee's Hill Farm prove the value of Seagram-supplemented, scientific feeding: (in a 365 day period):

Royal Domine 25,437 *lbs. milk,* 1,047 *lbs. butter fat*

Royal's Rapture 29,095 *lbs. milk,* 1,228.24 *lbs. butter fat*

Royal's Gima 25,572 *lbs. milk,* 1,210 *lbs. butter fat*

---

a 45 *cow herd produces* 1,000 *quarts of milk per day.*

Lee's Hill Farm holds top honors for the Brown Swiss breed of the 1949 *International Dairy Exposition and National Dairy Cattle Congress.*

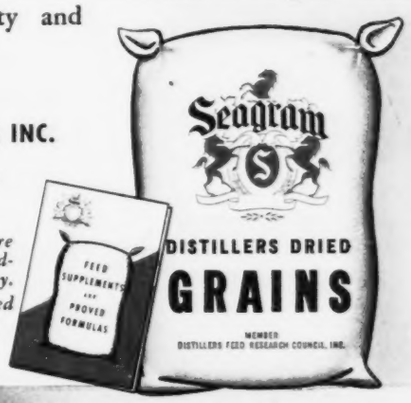
PROVING GROUND . . . FOR DAIRY PROFITS

Profit conscious, scientific feeders, like Vernon Hull, know that the *amount* of feed milk cows eat is not the only answer to the milk production problem. They've learned that *food value content* is equally important. Seagram dried grains used to balance the rations of the Brown Swiss herd at Lee's Hill Farm have contributed much to an outstanding production record.

Here is proof that balanced rations containing Seagram Dried Grains add profit value to your milk production records. Important B-complex Vitamins, plus other lactation factors, together with rich proteins, minerals and fats contained in Seagram Dried Grains are vital to quality and quantity milk production!

JOSEPH E. SEAGRAM & SONS, INC.
GRAIN PRODUCTS DIVISION
BOX 240, LOUISVILLE 1, KENTUCKY

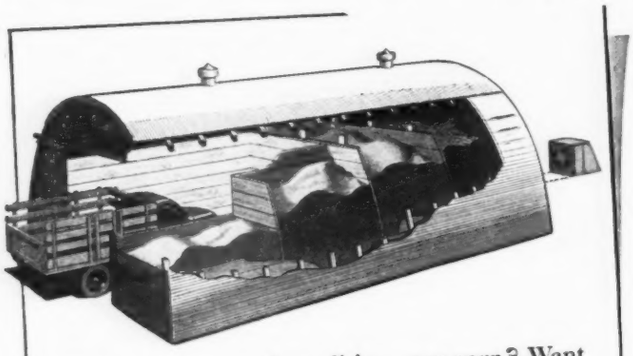
Seagram Dried Grains and Solubles are available through dealers for use in feeding all types of livestock and poultry. Write today for free Booklet "Feed Supplements and Proved Formulas."



Seagram SERVICE TO AGRICULTURE

FARMERS STEP UP PROFITS WITH "ON THE FARM" STORAGE

Sturdy, strong, fire-safe Quonsets enable farmers to take advantage of Government Price Support Program



Want to store—and condition—ear corn? Want to store shelled corn, wheat, oats, soy beans, cottonseed—or any crop—in *one* building, and still have room for truck or implements? It can be done in the versatile Quonset. Study the illustration above—simple partitioning of a Quonset makes it *right* for storage of a variety of crops. Quonsets permit you to hold crops safely for peak prices—meet all CCC requirements for crop storage at a low cost per bushel. Get all the facts on this great farm building today!

Your Best Buy in Farm Buildings

Quonsets

Stran-Steel and Quonset Reg. U. S. Pat. Off.

See Your Dealer Today!

YOU NAIL TO STRAN STEEL FRAMING

GREAT LAKES STEEL CORPORATION

Stran-Steel Division — Ecorse, Detroit 29, Michigan

NATIONAL STEEL CORPORATION

LETTERS

HOW YOU GONNA KEEP 'EM?

Sir:

I've intended to write you to tell you what a swell job you are doing with *The Farm Quarterly*. Unfortunately, however, both of our boys decided that they did not want to farm so I'm working harder than I ever did in my life on the farm. Labor is very short and we've got 20,000 bushels of clean, beautiful apples which we'll start harvesting tomorrow.

Our crew last night numbered only twelve, while we should have at least twenty more pickers right now. In 24 years I've never seen labor so scarce or so darn independent. I brought in one crew from Florida but some of my neighbors baited half of them away and I've got a couple of scouts trying to line up another crew to move in by air from Florida tomorrow.

Our youngest boy returned from two years in Korea and promptly re-enlisted so he is probably back there by now although the last report from his squadron was in Texas. The older boy is building artillery at Rock Island Arsenal. When you compare farm earnings with mechanics pay you can't help but worry a bit about this whole farm picture. Some of the best boys are tempted away from the soil.

Myron S. Hazen

Milton-On-Hudson, N. Y.

ABOUT COMPOST

Sir:

My article "Compost Goes Commercial" which appeared in the Fall issue of *The Farm Quarterly* contained the following statement, which I wish to disown:

"But if soils are very low in nitrogen, phosphorus and potash, compost alone can not supply it, unless applied in quantities often prohibitive for the average farm."

Hundreds of organic farmers have proved that that is not true.

Robert Rodale

Emmaus, Pa.

THE UNCOMFORTABLE CALF

Sir:

On my ranch I would not let a cow-hand carry a calf as you show us on page 44 of your Summer issue.

The guts of the little animal will be in no time bruised and mangled in such a way that most times it makes it very precarious to thrive in good health again.

If the horse walks, it wiggles waggles, if the horse trots, imagine a jumping jack. In both instances he will show you pretty soon how uncomfortable he feels by disgorging his food, and presto, your helping hand or your leg and stirrup will receive what is left of his last meal.

César Bressani

California.

But it makes such a cute picture.—Ed.

ALL DONE BUT THE CHURNING

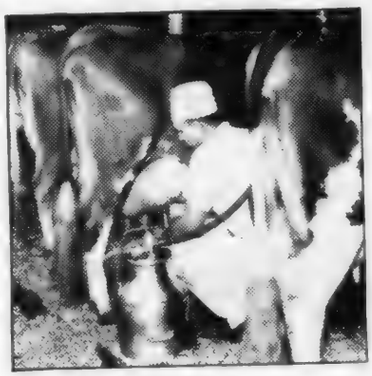
Sir:

A thousand thanks for your excellent article on home-made butter—something I have been looking for for a long time.

M. Shotwell

New Bloomfield, Pa.

Now! MORE MEAT, MILK & EGGS in every bag for you!

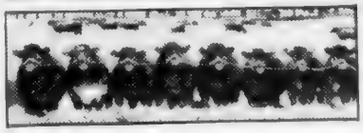


MORE THAN EVER BEFORE

Brand new, proved nutrition factors in Wayne give your birds more feed-power for more eggs . . . steadier laying . . . lower production cost. Improves hatchability, too!

MORE THAN EVER BEFORE

New feed-power in Wayne Dairy Feeds, proved by months of exhaustive tests, gives you the means of getting more milk per cow, longer lifetime production from your herd.



MORE THAN EVER BEFORE

Improved feed-power of Wayne Hog & Cattle Feeds brings you all that's new in animal nutrition. Speedy gains . . . short feeding periods . . . more net profit for you!

TOMORROW'S FEEDS...TODAY

Never-ending studies at the Allied Mills Research Farm (above) plus scientific tests for "IQ" (Ingredient Quality) continually bring you Tomorrow's Feeds . . . Today!

WAYNE FEEDS

YOU BE THE JUDGE

Your friendly Wayne Feed Dealer has these powerful new feeds for you NOW. Put them to your own test, under your own conditions. Whatever your present feeding set-up, you'll soon prove to yourself why *now* . . . more than ever before . . . it *pays* to feed Wayne!

ALLIED MILLS, INC.
Executive Offices: Chicago 4, Ill.
Service Offices: Ft. Wayne 1, Ind.

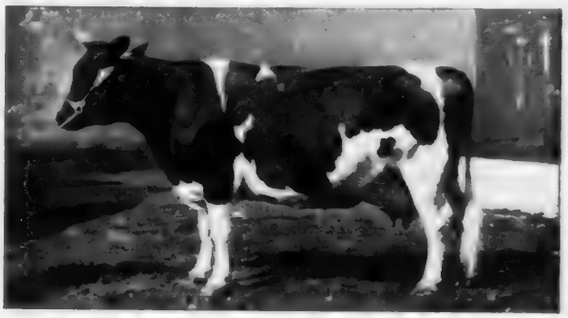
Back of Every Successful Livestock Enterprise Is a Sound Feeding Program

Illinois Farmer Markets 93 Pigs from 11 Sows!

Big litters are profit litters! Especially when they gain like Clarren Moore's pigs did! This Poplar Grove, Illinois hog raiser marketed 11 litters that averaged nearly *9 pigs each* to earn $2.66 for each bushel of corn he fed. (This was better than $1.00 per bushel more for his corn than market price at that time.) Sows saved 94 pigs to 4 weeks of age on the Wayne self-feeding program of corn, oats, alfalfa meal and Wayne Brood Sow Supplement. "They maintained good flesh, but did not get too fat and they milked well" says Moore. Pigs got a fast strong start on Wayne Pig Starter and made rapid economical gains to marketing on Wayne Hog Supplement and corn. 93 were marketed. "You can see why we're happy to be on the Wayne Way of Hog Raising," says Clarren Moore.

$190 from $100

"We keep records in cooperation with the University of Illinois College of Agriculture," says W. Harry Phipps, Charleston, Ill., who has fed Wayne for more than 11 years, "and *our hens bring in between $180 and $190 for every $100 worth of feed fed them.* Too, our Wayne-fed cows produced enough to be fifth high herd in the state, the first month we joined the D.H.I.A.!"



Southwold Madcap Mercedes Girl 2391449
H.I.R. at 4 yrs. 8 mo. 365 days, 19,055 milk, 4.0% 759.7 fat (2x)

High Production—Plus! There's proof of Wayne feed power in the records of F. W. Frank, Hobart, Indiana, taken from the Holstein-Friesian Ass'n. Herd Improvement Registry:

Number of cows in herd	31
Average milk production	13,252 lbs.
Average butterfat production	480.0 lbs.
Average per cent butterfat	3.6

"The records speak for themselves" says Mr. Frank.

Prove to Yourself...
It Pays to Feed The Wayne Way

Allied Mills, Inc., Ft. Wayne 1, Indiana
Send free feeding information on:

Chickens ☐ Turkeys ☐ Calves ☐
Hogs ☐ Dairy Cows ☐ Beef Cattle ☐

(other)

Name .....

Address .....

Town ..... State .....

let's do it right next year...

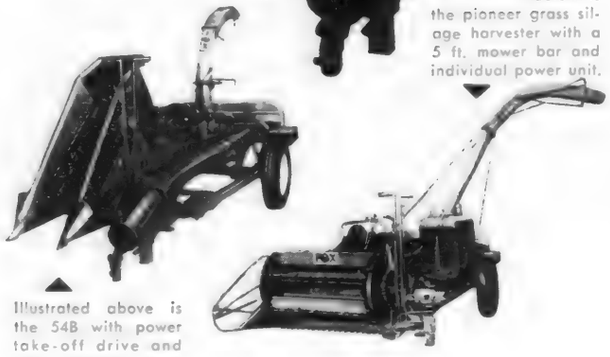
WITH

The NEW FOX Forage Master.

with the QUICK CHANGE Harvesting Units

The new FOX is 700 lbs. lighter, 18" shorter, yet it has greater capacity, greater strength and many new features.

Below is the pioneer grass silage harvester with a 5 ft. mower bar and individual power unit.



Illustrated above is the 54B with power take-off drive and corn harvesting unit.

● You have been harvesting your crops the hard way, now do it the easy way with the Fox Forage Master. The New Fox is the result of more than 20 years' experience in manufacturing pick-up hay choppers. It has many special features not found in other forage harvesters. Outstanding among these features are:

- Safety cutting principle — positively protects machine against damage by stones or other foreign objects.
- Quick-change Harvesting Units. Can be changed to Pick-up, Mower Bar or Corn Unit in less than 10 minutes.
- Easily and accurately adjustable cutting bar.
- Quick-change knives.
- Perfect alignment of cutting mechanism assured by exclusive all steel one-piece frame construction.
- Large oversize tires.

Learn how much easier it is to do it with the Fox Forage Master.

Write today for New 1950 Catalog

FOX RIVER TRACTOR COMPANY

The Pioneer of Modern Forage Harvesting

5120 North Rankin Street

APPLETON FOX WISCONSIN

A WORD FOR THE BRITISH

Sir:

This letter is to compliment you on the story of farming in "Socialist" England.

In view of all the critical comments which are being published about the decadence of the English, it is a relief to read something which indicates the general stability which always prevails in England regardless of their politics. I think the American people need to be told about the progress and good faith of nations outside.

Of course, I was particularly pleased that this story on English farming should have appeared in the issue in which my story of the Century Farm was published.

Stamford, N. Y. George D. Taylor

THE PRIZE GILT

Sir:

The Berkshire gilt given to our chapter as a prize for selling *Farm Quarterly* is coming along fine. She farrowed ten pigs (saved nine) the

11th of September. Enclosed is a picture taken when we received the gilt. Mr. Jackson and I want to thank you for the gilt.

Richard Miles, President
Fred P. Jackson, Adviser
Whiteland School FFA,
Whiteland, Indiana

During the summer of 1950 FFA chapters across the country sold *Farm Quarterly* to build up their treasuries. Whiteland School chapter won their registered, bred gilt against strong competition in a contest for Indiana chapters.—Ed.

HORMONES FOR THE YOUNG

Sir:

In the autumn issue of *The Farm* we note your comments concerning the subject "Hormones Tenderize Tough Old Roosters".

We're in complete accord with your comments until you get down to the middle half of the second paragraph "The pellets work best with old birds". It is true that old males are improved in their eating qualities by the use of these synthetic hormones, but it is equally true that when used on young broilers, at 6 or 7 weeks of age and marketed 4 to 6 weeks later—they add appearance, and taste which make them highly desirable to the consumer.

Some markets bring a premium of from 5 to 8c a pound at the retail level and this is reflected back to the grower at from 2 to 5c a pound—live weight.

Cliff D. Carpenter, President
Chicago, Ill. Institute of American Poultry Industries

HELP WANTED

Sir:

I am a native of Ohio (Columbiana County) but have spent 55 years in Missouri and the last 50 years down in this southeast corner in the alluvial district where the soil is deep and rich much like parts of northwest Ohio. I have cleared and developed 2400 acres in that time; have 1200 in one tract where I raise hogs and Angus cattle for meat. I am now past 85 years of age and am looking for a man to help me. He must be a stock lover as well as a farmer. My lands are about the best improved you will find here and the farm was built for permanent stock growing. I have good water, electric system. Two of the houses equipped with water and baths.

I started by working my way at Antioch College at Yellow Springs in 1890.

I have two sons, one an electrical engineer with Westinghouse now for 25 years and the other, a lawyer, is doing personnel work for an oil company at Tulsa, Okla. But they want to keep the land I have developed. I hope to find the kind of family I need and I will give the man the opportunity to make money.

Dexter, Mo. S. E. Newhouse

Low-Cost Buildings
that save money, make money, built with
REYNOLDS *Lifetime* ALUMINUM

1 POLE-FRAME BARN
...less initial cost, less operating labor!

2 COMPLETE MACHINERY CENTER
...organized for working efficiency

3 LIVESTOCK SHED
...new-type roof uses 1/3 less rafters!

4 New! PORTABLE HOG FARROWING HOUSE AND SHELTER

This 2-section, 4-sow farrowing house is easy to build. Approximately 15'x20' in size, design saves both labor and material. Sides panelled for farrowing. Center alley for feeding, watering. Alley gates and partitions removable so that sections can be separated for summer shelter and shade. Sections movable through standard farm gates.

ALUMINUM MAKES THIS HOG HOUSE EASIER TO MOVE . . . AND COOLER INSIDE, SO HOGS GAIN MORE WEIGHT ON LESS FEED!

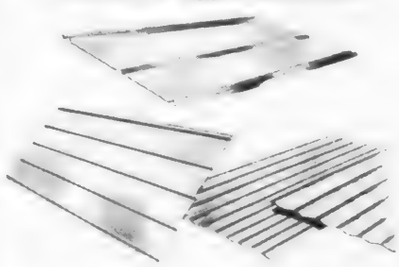
Tests prove hogs take much less feed per hundredweight gain if protected from severe heat...just as poultry and dairy cows produce more. Aluminum-roofed buildings reduce inside summer temperatures up to 15°...keep buildings warmer in winter, too! You pocket the difference in dollars!

This hog house is easy to build, rust-proof without painting, light to haul. For shelter and farrowing...it's a year-round operating tool. Like all the buildings shown it was developed by Doane Agricultural Service, built and approved by farmers.

Plans referred to below include in each case detailed erection instructions, sources of treated poles, and list of materials.

Reynolds Metals Company, Building Products Section, Louisville 1, Ky.

ASK FOR REYNOLDS *Lifetime* ALUMINUM CORRUGATED, 5-V CRIMP, WEATHERBOARD ...smooth or stipple-embossed!



High-strength, precision-made sheets that lap snugly for extra weathertightness. Ask your dealer, too, for Reynolds *Lifetime* Aluminum Gutters, Downspouts, Reflective Insulation, Aluminum Nails.

Reynolds also serves the farmer with Aluminum Cable (ACSR), Portable Irrigation Pipe, Siphon Tubes, Paint Pigment, Reynolds Wrap and Freezer Foil.

FARM INSTITUTE

Plans for the Barn (1) and Machinery Center (2) shown at top, $5 each; Livestock Shed (3), $2; Hog House (4), $3. Further descriptive literature free. Check by number on the coupon.

Note the "Aluminum Adaptor Plan" offer—for use with any U. S. Dept. of Agriculture drawings. And you'll want that 8-page catalog!

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Please send me FREE ☐ "Aluminum Adaptor Plan"; ☐ 8-Page Catalog of Aluminum Farm Building Products; ☐ More information on buildings numbered (1) (2) (3) (4).

I enclose check or M.O. in amount of $_____ for complete plans for buildings (1) (2) (3) (4).

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A farm in the Touraine section of France, famed for its lovely countryside.

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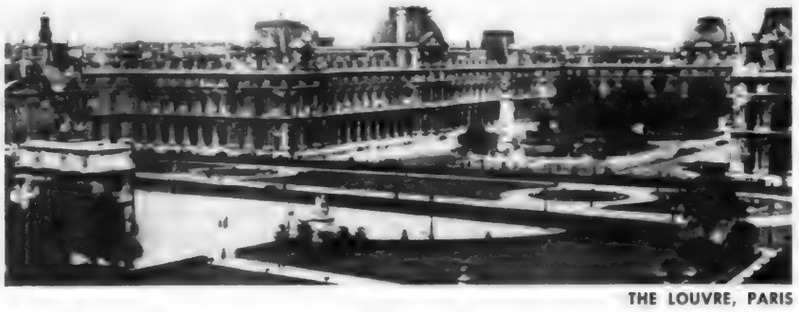
You'll cherish every day you spend in France for years to come! The gay bustle of Paris streets, the honking of taxis, the flower markets and the carefree little Seine steamers . . . the Louvre and the Eiffel Tower and the Arc de Triomphe. The sunny sidewalk tables and the fabulous Paris-after-dark. And the shopping. But your trip is not complete until you've seen the rich and beauteous countryside: old world towns with their medieval architecture—ancient Roman ruins—quaint fishng villages. Everywhere you go you'll find genuine hospitality.



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For reservations, see your travel agent who can tell you about specially planned Farmers' Friendship Tours. Or for booklets, address Dept. F2, Box 221, New York 10.

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THE FARM'S PICTURES

Hillbilly Snapshooter Joe Clark

Cover by Robert Travis Keagle

5—Elwood Armstrong. 8—Carl Mansfield. 10—Loyd Rile. 12—Joe Clark. 14—Mercury Pictures; USDA. 16—Joe Munroe. 20—Joe Munroe. 22-23 — John R. Robinson. 24 thru 27 — Joe Munroe. 28 — Godfrey Lundberg; Joe Munroe. 29—Joe Munroe. 30-31—Joe Clark. 32—Phil Palmer. 33—S. A. Goddard; John A. Stryker. 34—S. A. Goddard; Gene Smith Studio. 35—Fred Knoop; Phil Winegar. 36 thru 41—Joern Gerdts-*PIX*. 42—Scott, DeMotte & Perry, Inc. 43—Robert S. Gray; Scott, DeMotte & Perry, Inc. 44—Teamon L. Jones. 45—Teamon L. Jones; Scott, DeMotte & Perry, Inc. 46—Allan Kain; R. J. McGinnis. 47—John H. Gerard-*National Audubon Society;* Allan D. Cruickshank-*National Audubon Society*. 48-49—South Carolina Extension Service. 50 thru 56—Joe Munroe. 57—Joe Munroe; H. W. Lathrope. 58—A. L. Lang. 59—A. L. Lang; K. R. Imig. 60-61—Fred Knoop. 62—Arthur Lavine-*Black Star*. 63—J. W. McManigal. 64-65—Joe Munroe. 66—J. E. Weaver-Univ. of Nebraska. 67—A. R. Midgeley; J. E. Weaver-Univ. of Nebraska. 68—Joe Munroe. 69—G. A. Grant. 70—C. J. Belden. 71—USDA. 72—G. A. Grant; Cy LaTour & Son. 73—G. A. Grant. 74—Ira Haas. 75—Ira Haas; USDA-Knell. 76-77—Joe Munroe. 78—Kosti Ruohomaa-*Black Star*. 79—Cy LaTour. 80-81—R. J. McGinnis. 82—Cas Oorthuys; R. J. McGinnis. 83-84—Cas Oorthuys. 85—R. J. McGinnis. 86—Cas Oorthuys. 87—R. J. McGinnis. 94—Joe Munroe. 98—R. J. McGinnis. 102—Joe Munroe.

THE AUTHOR of "Who Grades and Prices Beef": James McMahon describes his home town in Northeastern Montana as being, "so small that I can practically claim to have been born on a farm." After graduating from the University of Montana, he did a stint with a Montana newspaper and then became an information specialist with the USDA. At the present time he is working on livestock marketing information for the Production and Marketing Administration.

THE AUTHOR of "The Morgan Horse": M. F. Bayliss has had a fantastic career that goes from a study of inherited criminal tendencies in man to a study of the inheritance of speed in horses. At 16 Miss Bayliss was a specialist in heredity for the Holstein-Friesian Cattle Club. She then became an anthropologist and did her study of criminals in the New York prison system. After further study she became a mammalist specializing in horses. Among her published works is the authoritative, "The Matriarchy of the American Turf." Soon to be published: 'The Splendid and Renowned Morgan Breed of Horses."

For a big change in your profits

make just one change in your feeding plan!

during the critical "weaning period"

Feed Semi-Solid, *too!*

PIG EMULSION

Recommended at all three critical periods for maximum growth! Three critical periods—gestation, suckling, weaning . . . determine the final weight of your hogs. During these three periods either Semi-Solid Pig or Sow Emulsion is a "must" to give your pigs a good start! And to make the most of that good start, up-to-date farmers keep feeding Semi-Solid Pig Emulsion through the important fattening period.

Contains the critical factors for these critical periods! The base of these wonderful Semi-Solid products is condensed whey greatly stepped up in milk proteins, milk minerals and Vitamin B Complex (including APF). In addition, Semi-Solid Pig and Sow Emulsions are reinforced with plenty of Vitamin A and D Feeding Oil. They also contain other dairy by-products and some cereal products. When you feed Semi-Solid Pig or Sow Emulsion in addition to your grain and supplement, you are insuring your pigs a daily extra ration of important "growing" nutrients.

Start Semi-Solid now . . . during the critical "weaning period". You can help avoid weaning set-backs by starting your pigs on Semi-Solid Sow Emulsion 5 weeks after farrowing. Feed it as a drink until you separate your sow from her pigs. Then switch to Semi-Solid Pig Emulsion. Keep feeding that until your pigs are 4 months old. That way, your pigs can go through the critical weaning period into the important fattening period with no weaning weight losses to make up, and you'll be pounds ahead at market time. Start Semi-Solid Pig Emulsion today. Notice the change in your profits this one change in your feeding plan can mean. Ask for Semi-Solid Pig Emulsion at your feed store.

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IF YOU HAVE 40 ACRES YOU HAVE A GOLD MINE!

On just 40 acres you can feed and raise 1,000 top weight hogs every year with the new Semi-Solid System. Write for free plans, blueprints, and information on this amazingly successful system of raising hogs. No matter how few your hogs—or how many—the Semi-Solid System can increase your profits. Send postcard to: Consolidated Products Company, Dept. FQW, Danville, Illinois.

"The Semi-Solid System" of raising hogs

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two other money-makers — for you from Consolidated

Best and Cheapest Way to put up *ALL FORAGE!*

PAPEC Model 151D FORAGE HARVESTER

More than 50 years experience in building successful forage handling machinery is back of every Papec Forage Harvester. In competitive tests, Papec Harvesters handle more hay or row crops and pick up down or tangled crops that other harvesters won't touch.

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For complete information see your Papec dealer or send postcard for NEW booklet.

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The Poultry Yard

A REVIEW OF FACTS AND FINDINGS CONCERNING MANAGEMENT OF THE POULTRY FLOCK AND THE USE OF POULTRY REMEDIES.

The Gleam in a Chicken's Eye

The reason hens lay more eggs when the poultry house is lighted on winter mornings is not that they have a longer feeding period, but because the artificial light exerts a hormone-stimulating effect when it travels through the eye nerve to the pituitary gland. The pituitary then secretes larger amounts of an ovary-stimulating substance, more yolks are formed, and egg production is increased.

The lights should be turned on at four in the morning and kept on until sun-up. Since most poultrymen do not feel that they need any stimulation at this time of the day, a master switch connected with an alarm clock is the best way to turn the lights on. A reflector behind the light will increase its efficiency enormously—if the reflector is kept clean. Poultry house dust will cut down on the efficiency of a reflector. Two 50 watt light bulbs with 16 inch reflectors should be sufficient to light a laying house that is 18 by 20 feet if they are placed so that they shine on the mash hoppers and scratching area.

LIGHT makes eggs.

When the lights have been started they should be operated each day until spring; stopping them may cause the hens to stop laying entirely, a minor tragedy during the winter when egg prices are high.

Buy Pullorum Free Chicks

An unhatched chick can catch pullorum disease from the egg next to it in the incubator. When the sick chick can run among its fellows, the disease spreads like gossip at a quilting bee. Pullorum disease, also called *bacillary white diarrhea,* can be passed from bird to bird or from hen to chick or poult in the egg by chicken or turkey hens. It can easily be spread through shipping boxes or by placing healthy chicks in contaminated houses. Losses of baby chicks and reduced egg production of hens and pullets makes pullorum a money losing disease to have on the farm.

PULLORUM kills chicks.

If the disease follows a rapid course, the only warning a poultryman may have that his chicks have pullorum are dead birds. Usually he will find the sick birds standing forlornly, with eyes closed, feathers roughened, and wings drooping. They will cheep dismally until they fall over and die. Since these symptoms are also present in other diseases, a trained veterinarian should be consulted for a final diagnosis.

Since there are no drugs known that will immunize the birds against the disease or cure it once it has started, the only practical way to attack the disease is to try and keep it off the premises. Poultrymen who buy from hatcheries that comply with the requirements of the National Poultry Improvement Plan, know that they are getting chicks and poults from pullorum-tested flocks. These men will also make sure that their own poultry houses and yards are disinfected so that the young will be put in disease-free surroundings.

THE REAL McCOY
like Foremost Feeders Everywhere
CHOOSES SUPERSOL, TOO!

Dr. W. F. McCoy
DENTIST
404 WEST VIRGINIA BLDG.
HUNTINGTON, WEST VIRGINIA

Sept. 26, 1950

Grain Department
Brown-Forman Distillers Corp.
Louisville 1, Kentucky

Gentlemen:

Please repeat my usual order of SuperSol pellets as quickly as possible. We have almost run out and can't afford to be without SuperSol. It is the best feed supplement we have ever used.

I am enclosing a picture of the Lawrence County, Ohio, Champion Bull ... R.M.H. Sire Domino 12th, son of Morlunda H. Domino 12th. Thought you might be interested because this bull was never on a nurse cow but was fed SuperSol from calfhood.

Thanking you for your promptness in shipping this order, I am,

Yours very truly,

REAL McCOY HEREFORD FARM
Dr. W. F. McCoy, D.B.S.

You've probably read, in previous B-F SuperSol ads, what foremost feeders everywhere say about the excellent results they get by feeding their cattle this high-vitamin, high-protein supplement.

Now comes the Real McCoy, who states without reservation that B-F SuperSol "is the best feed supplement we have ever used" and that he "can't afford to be without SuperSol."

Today, much more B-F SuperSol is being used as a feed supplement by far more of the nation's foremost feeders than ever before! Try it yourself and you'll see why *the men who know their cattle best choose B-F SuperSol!*

R.M.H. SIRE DOMINO 12th Lawrence County, Ohio, Champion Bull . . . from Real McCoy Hereford Farm.

Photograph by L. A. MOBAYED Huntington, W. Va.

FREE!

This booklet tells what SUPERSOL will do for your livestock!

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FEED DIVISION
BROWN-FORMAN
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(Available in pellet or granular form.)

PROVIDES

true VITAMIN A
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FATS and PROTEINS
CALCIUM, PHOSPHOROUS
and ESSENTIAL TRACE MINERALS

plus **VITAL PRODUCTIVE FACTORS**

FOR YOUR NEW FENCE . . .

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★ **EASY TO USE** ★ **CAN BE APPLIED COLD**

★ **DRYS QUICKLY and LEAVES WOOD CLEAN**

Do you spend valuable time replacing fence posts . . . time you'd like to give to a thousand-and-one more profitable jobs?

Today you can save both time and money by treating your fence posts with DOW PENTA-chlorophenol. This *tested* wood preservative prevents decay and can be applied simply and cheaply right on your own farm.

You just soak the posts for the required length of time in a solution of "PENTA" in petroleum oil. Your empty oil drums will serve as containers for the soaking. Do this and you will have long-lived fence posts and lumber free from decay and termites.

THE DOW CHEMICAL COMPANY
MIDLAND, MICHIGAN

SEND TODAY for free booklet: "Before You Could Build Your Barn".

The Dow Chemical Company
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Tell me more about PENTA and its use in
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FARM BOOKS

Forage and Pasture Crops,
by W. A. Wheeler
D. Van Nostrand Co., New York *$8.00*

During the past two years there has been a positive rash of books published on pasture crops, pasture management, forage production, and grass. One of the latest, and certainly a contender for the distinction of being the most comprehensive, is *Forage and Pasture Crops* by W. A. Wheeler. This 752 page, compactly written book is the culmination of half a century of work on seeds and forage crops.

ALL OUR PASTURE plants are discussed.

The task that Wheeler sets for himself is a formidable one; it is to create a reference work that includes all grasses and legumes that are grown for forage or pasture in the United States.

In general outline, the book is divided into four parts. The first part is a 240 page section that takes up the grasses and legumes that make up our forage crops, the soils and fertilizers that are used for forage production, management of pastures, hay and silage making, and other related subjects from a very general point of view. This one section is, in effect, a book within a book on how to grow, manage, and harvest forage crops. The second section of the book is devoted to the legumes that are grown in this country and the third section takes up the grasses. Each of these two sections is broken up in o chapters on families of legumes or grasses such as Red Clover, the Vetches, Bluegrasses, and Fescues, and each chapter is further divided into a discussion of the growth problems of the family and a detailed discussion of each variety of the family. Alfalfa, for example, is given a chapter which covers the origin and history of the crop, a description of it, its adaptation, the soil requirements and land preparation and other cultural problems, its use as hay and pasture, and a detailed description of the two dozen varieties. The fourth section of the book is composed of charts giving seed information about the crop.

(Continued on page 124)

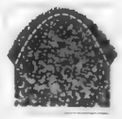
25 Years Service—35 Cents Upkeep

A California farmer reports this remarkable service from his NEW IDEA Spreader. An Illinois cattle feeder writes of fine results still delivered by a NEW IDEA bought in 1925. So they come in from every part of the country . . . actual owners' accounts of *continued* excellent performance by "veteran" NEW IDEA Spreaders . . . many of them built 25, 30 and even 40 years ago.

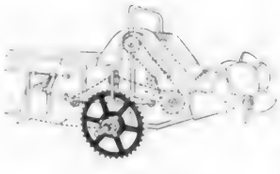
And NEW IDEA is building them better than ever today — with advances that promote even greater soil-building efficiency! For example: Improvements in the famous NEW IDEA distributor design assures even finer shredding — uniformly wider spreading. There's a more massive drive sprocket — extra powerful, extra durable, exceptionally smooth-running. There's a simplified hitch that permits quickest, easiest coupling to any tractor. There are stronger self-aligning bearings; tougher "U" shaped cylinder teeth; sturdier and freer rolling wheels; bigger load capacity.

that's why a* NEW IDEA *is a good idea!

N. Slikker, Ripon, California, with his NEW IDEA Spreader — used every year since 1925. Says Mr. Slikker: "This spreader has hauled thousands of loads and has never broken down. Total repair cost to date has been 35 cents."



Flared, Non-choking Bed. *Allows easier, higher loading. Reduces packing, prevents choking and bunching. Lined with select, treated lumber—outlasts other types by many years.*



Plenty of Driving Power. *Larger, sure-action drive sprocket directs power to cylinders and distributor. Runs straight and true — provides ample clearance for use on rough fields.*

Positive Pulverizing. *Wide Spread Distributor does an unexcelled job of pulverizing and spreading. Handles tough manure easily. Precision-built, rugged—a NEW IDEA "first."*

Yes, over the years there's been many a change in NEW IDEA Spreaders. But the same honest to goodness workmanship — the same original policy of quality without compromise — will never be changed! For more details see your NEW IDEA dealer, or mail coupon. For *most* value choose a NEW IDEA!

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DIVISION AVCO MANUFACTURING CORPORATION

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Address_____

Mail coupon today for free guides to better farm profits!

You Can Save On Farm Building Costs with BUTLER Steel Buildings

DAIRY BARN—Plenty of space in Butler Buildings to install complete equipment for a modern, well-ventilated, up-to-date milking parlor.

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HAY & GRAIN STORAGE—A dual-purpose Butler Building with one end closed and partitioned off for bulk grain storage . . . the other end open for sheltering hay or livestock.

IMPLEMENT SHELTER & TOOL SHOP—Safe, weathertight protection for expensive farm implements and equipment. Plenty of room for tool shop and repair facilities, too.

Easily Adaptable to All types of Farm Buildings

Make permanent farm improvements now—*and save up to 50% on costs*—with Butler Steel Buildings.

You can use these adaptable, low-cost buildings for any farm purpose. No maintenance or painting is necessary. Rodents and termites can't damage them. You have a permanent, all-metal building that lasts for years. Easily insulated if your needs require it.

See how quickly, easily and economically you can have a Butler Building erected to meet your farm building needs. Mail coupon today for complete information.

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Please send information on Butler Buildings:

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7378 East 13th St., Kansas City 3E, Mo.
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STATE _____

The Dairy Barn

A BRIEF SUMMARY OF THE NEWEST DEVELOPMENTS IN DAIRYING AND THE CARE OF DAIRY CATTLE.

Heifers Bred Too Young Old Ranger, our Shorthorn bull, had done it again. He had broken through the weak spot in the south pasture fence, swaggered through a corn field, sampled the tender lettuce of a neighbor's garden, and then driven by stronger urges, had charged on cross-country.

We found him late in the afternoon by following the trail of chaos that he left behind. There were ruined fences, smashed gates, a washing torn from a line, and two hives of bees upset in the vicinity of a neighbor's outhouse. Most important was the questionable condition of six young registered Jersey heifers in the field where we found him.

The problem of what to do with heifers that are bred too young occurs in the best of families. The smaller dairy breeds present a special problem: Jersey calves, for instance, can become pregnant at three months of age.

The value of the heifer will usually determine the action called for when a heifer is bred too young. A valuable registered animal can often be aborted by a skilled veterinarian. The rupture of the yellow body will cause the heifer to abort and she can, after a little special care, go back to her task of growing up. Hormone injections have been used to abort heifers but hormones are risky, for animals so treated often develop sterility.

The less valuable heifer or the slightly older animal may be carried through its normal pregnancy on a lowered protein ration to prevent the fetus from getting large. Dr. Fordyce Ely, Chairman, the Dairy Department, Ohio State University, makes this statement: "Our experience has been that a young heifer, even though she be somewhat smaller, has comparatively little difficulty at calving time because of the softness of the bone. But still it seems unwise to breed her too young. She should have an opportunity to grow and develop because lactation inhibits growth. We have found it quite satisfactory, in many instances, to withhold breeding for the second calf, giving the animal a chance to grow and develop and at the same time not push her too hard for production."

Some advocate drying up the young heifer soon after freshing and giving her a better ration, such as one-tenth soybean oil meal and nine-tenths corn and cob meal. This, too, depends a great deal on the value of the animal.

Dairy specialists point out that cattle do best when bred at these ages and weights:

Setting New Standards...

FOR LIGHT-TRACTOR PERFORMANCE

JOHN DEERE "M" Series TRACTORS

AND A GREAT LINE OF QUIK-TATCH TOOLS

A John Deere "M" Series Tractor with matching tools for your farm is worth more to you *because it offers more.*

Get up on the seat of one of these modern, quality-built tractors and *drive it* . . . on your own place if you like . . . and make note of the extra values it offers you.

Put it under load—you'll quickly see that it has the same lugging power and sustained speed which have made the larger John Deere 2-cylinder tractors famous for getting *more work done in a day at lowest operating and maintenance costs.*

At the same time, we believe you will find that you have never before operated a tractor so easy to handle, so comfortable for the operator—one that gives you so much value in the features that mean most.

And remember, John Deere "M" Series Tractors are available with a wide choice of field-proved Quik-Tatch working tools to handle efficiently the many jobs on your farm.

Get full information from your John Deere dealer. Write for free literature on the model (or models) in which you are interested.

JOHN DEERE

MOLINE • ILLINOIS

M — 1-2-Plow General-Purpose. For Complete Power on Smaller Farms . . . Helper Tractor on Larger Farms.

MT — 1-2-Plow Tricycle-Type General-Purpose . . . Big Tractor Capacity in Cultivating with Light Tractor Economy.

MC — 2-3-Plow Track-Type . . . for Use Wherever Extra Traction, Flotation, and Stability Are Required for Best Work.

ASK FOR A DEMONSTRATION

MINRALTONE HELPS BUILD CHAMPIONS

Here's a group of daughters of Good Acres Advancer. Approved. Good Acres' outstanding herd of Ayrshires is noted for its uniform good health and high production. They're *MinRaltone fed.*

Good Acres' Outstanding Herd Protected Against

HIDDEN HUNGER*

Good Acres, a 1000 acre farm at Waynesboro, Pa. boasts 250 head of fine Ayrshires. The herd's excellence is widely known — and judging from the photograph above, it will continue to produce standout Ayrshires.

Mr. D. W. Good is owner of Good Acres; Franklin C. Goshorn the Manager, and Charles A. Wagner the Herdsman. According to these men – "*We've been feeding MinRaltone at Good Acres for five years, premixing it, and allowing the herd free access to it. We find MinRaltone helps keep our herd in top-notch condition.*"

What MinRaltone will do for one breed, it will do for *all.* Follow the lead of successful dairymen – feed MinRaltone to your herd. MinRaltone protects against Hidden Hunger* because it contains 11 essential mineral elements with Vitamin D. Write for free MinRaltone feeding booklet and complete details.

NEAR'S FOOD CO., INC. • BINGHAMTON, N.Y.

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*HIDDEN HUNGER — Lack of essential mineral elements needed by livestock for sturdy health, rapid growth, peak production and reproduction.

NEAR'S

MINRALTONE

HEALTH - PRODUCTION - PROFITS

The next issue of THE FARM QUARTERLY will be on the newsstands March 6th.

Tell your dealer to hold a copy for you.

DAIRY HEIFERS of the smaller breeds can become pregnant at three months or younger. The veterinarian can often cause abortion and the calf then goes back to normal feed.

Breed	Age in Months	Measure Around Heart Girth	Weight
Holstein & Brown Swiss	16-18	68″	900 pounds
Ayrshire	16-18	65″	800 pounds
Guernsey	15-17	63″	725 pounds
Jersey	15-17	61″	675 pounds

Our neighbor, owner of the six young Jerseys, after waiting 21 days for the next heat period decided that Old Ranger had bred two of his heifers. "Maybe better fences," he reflected somewhat sadly, "would have saved us all a lot of grief."

—James M. Smith

Canned Milk Coming The day is coming when the housewife will buy milk in cans instead of bottles. The advantages of buying canned fresh milk will be an extremely low bacterial count and the fact that milk will still be sweet months after it is carried from the store.

The Bureau of Dairy Industry is working on the development of a satisfactory canned milk, and already milk has been held in cans for more than eight months at 45 degrees F. Plans are to have canned milk available within six months.

For the canned milk industry milk will undergo a somewhat different handling on the farm and in the milk plant than it formerly went through for the fresh market. According to present ideas on the system the milk will go from cow to customer without being exposed to air. The cows are milked by machine in a parlor. The milk flows into a glass jar and is then routed into a 100 gallon portable vacuum tank. Within three hours after milking the milk tank should be taken to the processing plant and emptied into a storage tank. Milk will no longer be cooled on the farm. In the milk plant it is homogenized, pasteurized, cooled, canned and put into storage, as fast as possible.

Dental Check For Cows Perhaps cows too should see their dentist twice a year. If a cow is having trouble digesting her food, or even eating it, her teeth may be at fault. One of the country's leading veterinarians recently pointed out that stockmen and veterinarians should be on the lookout for bovine dental troubles.

One cow refused to eat, and while the vet was checking her throat he sliced his finger on a sharp tooth. When the tooth was repaired the cow went back to her normal eating habits. Cows normally have good teeth for the job at hand, but teeth should not be ruled out as a possible source of trouble.

Allis-Chalmers' latest

the NEW **CA** *with 2-bottom mounted plow . . .*

the **WD** *with NEW 3-bottom mounted plow*

Here they are—the popular WD Tractor and its close-coupled *three*-bottom plow—and the new CA Tractor stepping out with its companion *two*-bottom plow.

In keeping with Allis-Chalmers policy, our power rating of these tractors is conservative. In extreme conditions, no, but in average soils, yes, they will handle these plow loads.

Both tractors are equipped with a **Hydraulic Traction Booster** that makes possible more actual drawbar pull. Automatically, the Booster increases weight on drive wheels to match the load.

Both have **Power Shift Wheel Spacing** that instantly adjusts rear wheel width by engine power.

Both have **Two-Clutch Power Control** (standard on WD, optional on CA). An auxiliary hand clutch halts forward travel without interrupting the power flow to power take-off machines.

Stop at your Allis-Chalmers dealer's soon for a look at the outstanding farm tractors of their time.

Both the new Model CA and the WD have a 4-speed transmission, built-in hydraulic control system for implements, hydraulic shock-absorber seat, low-pitch muffler, power take-off, drive pulley, lights, battery, starter.

TUNE IN
The NATIONAL FARM and HOME HOUR
Every Saturday • NBC

ALLIS-CHALMERS
TRACTOR DIVISION • MILWAUKEE 1, U. S. A.

IOWA

The home of corn and hogs and

IN IOWA, the land of the tall corn, there is also a tall story that has been going the rounds for years. The story concerns the arrival of a spirit at the gates of heaven. St. Peter, in the course of his admittance exams, asked the newcomer where he had lived. "I came from Iowa," said the stranger.

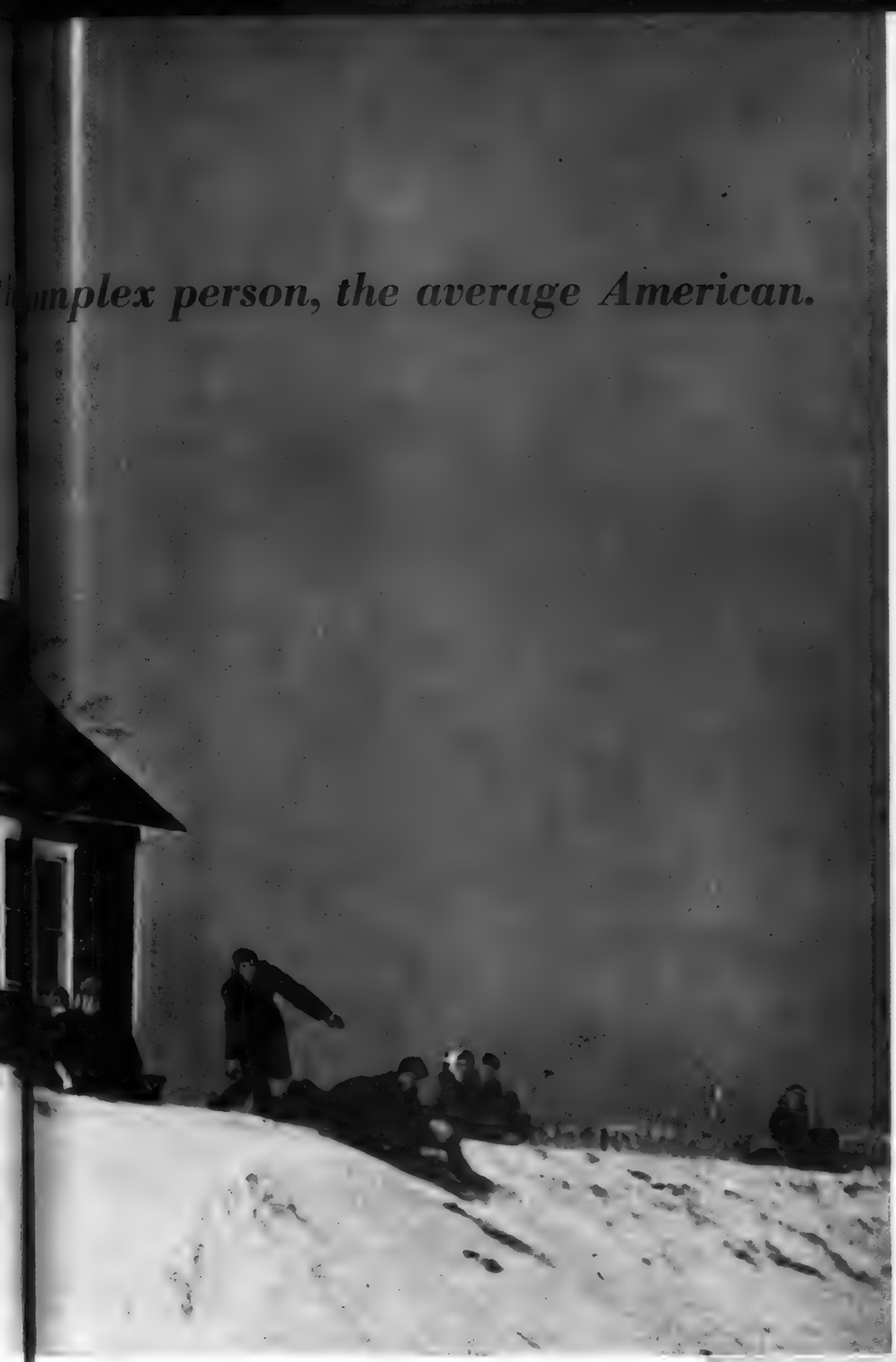
Across St. Peter's countenance spread a look of resignation. "You'd better go back," he said sadly. "You won't be happy here."

While to the native Iowan his state may at times fall short of heaven, he will insist that he has found the next best place. Times are good in Iowa, and people are busy at their work. Their work is primarily that of helping to feed the rest of the country and the world. Iowans say that their state is the national kitchen, that the rest of the states perform important functions, it is true, but that Iowa was placed near the middle of the land to feed it. And they are not far from the truth, for agriculture is the basis of Iowa's wealth, and her wealth is great.

Her land is fertile enough, and her farmers are skillful enough, to produce ten per

mplex person, the average American.

BY GEORGE LAYCOCK



IOWANS like their one-room schools where their children learn the three "R's" and the old-fashioned virtues. Their faith in the one-teacher school has been justified, for the state has the highest literacy rate in the nation. There are still 5,651 one-room schools in Iowa, but these, too, are passing; 2,882 have given way in the past 10 years to the new consolidated schools.

cent of the nation's food supply. Most Iowa school children can tell you without prompting that their state ranks first in the country in its production of hogs, eggs, chickens, beef, corn and oats.

Iowa, however is not a land of specialists. Few farmers keep more than two dozen sows, 70 head of feeder cattle or 200 chickens. As one farm leader said recently of his native state, "It's not that we do things in a big way in Iowa, or even that most of our farmers do an excellent job. It's just that they do a good job, and that there are 200,000 of them. Iowa is the leading egg producer because there are 200 hens on a majority of our farms, and Iowa is the leading feeder cattle state because there are 60 or 70 head fed annually on 200,000 farms. When it is all added up Iowa is average in a big way."

IOWA'S CHILDREN are her most important resource. A child's life is good in Iowa; he wants for few things, and he grows up expecting to spend his life on an Iowa farm. The Rees family (above), owns 120 acres and rents an additional 240. A typical day finds Dick, who is eleven, shooting starlings with imaginary bullets from his Hop-Along Cassidy gun, Jessie playing in the yard with her dolls, Ann and Mrs. Rees working in the house, Eli with Tom his son and partner, working in the corn fields. Family labor and the rich soil have made Iowa the top agricultural state. High incomes during the last ten years have gone into new fences, new paint and new farm buildings.

To see what it is that makes Iowa the leading agricultural state in the nation you must understand how a farmer such as Raymond Fisher, of Grand Junction, works with his soil, his crops, and his livestock.

Fisher doesn't look much like the storybook farmer; when he dresses up in his church going clothes he looks more like a business man, which he is.

With his wife and two sons he lives in the house where he was born. He bought the home place from the rest of the heirs in 1929 after he had farmed rented land for a number of years. Then in 1939 he bought a second place so that today he and his sons farm a total of 376 acres, practically all of which will, and does, grow corn. "Times are good," Fisher says. "The other day a farmer wanted to buy my tenant-operated farm for $400 an acre. Now you know it's not for sale, but it's good to know what it would bring."

Fisher feeds beef cattle, raises hogs and chickens, and keeps a half dozen dairy cattle which are milked by Rodger, who is 18, and Tom who is 17. "They've milked cows since they were six years old," Fisher says. "We never bought a milking machine because we never kept many cows, but now that the boys are old enough to do every kind of work around the place we'll either have to get a milking machine or let the milk cows go." His cows are grade Guernseys and he keeps a registered bull. He sells whole milk to a local dairy.

Fisher's first love, among his stock, is the feeder cattle. He feeds about 70 head a year. Every October he takes a week off and with three or four neighbors drives out to Nebraska where they visit ranch after ranch, choosing their steers as they go. "That's always a vacation," Fisher says, "and we get to see a lot of farming country."

Fisher buys the finer animals, because he likes to have top notch stock on his place. "I bought common cattle one year," he says, "and I hated them every day I had them. Made money on them too, but it just didn't make me feel good to have them around." The cattle market last fall upset Fisher's thinking. Feeder steers were selling higher than fat cattle. In a good feeder year farmers expect to make money both on the grain they add to their stock and the extra which fat cattle usually bring over feeder steers. But Fisher bought the cattle regardless of the price because after 20 years of fattening cattle he has decided that the cattle feeding business is not one to drop just because prices are cockeyed.

Before he buys his feeder stock in the fall, his spring pigs have been shipped to market. In the spring of 1950 he farrowed 40 sows from which he raised 265 pigs to market age. He had 24 sows ready for fall farrowing again by the first of September. Last year he hired a carpenter to build ten farrowing crates at a cost of $45.00 each. He uses the crates for three farrowings a year.

When his sows raise seven or eight pigs each Fisher is satisfied, for the Iowa average is 6.25 pigs per litter, and in Iowa a farmer need not beat the average by much to prove himself competent. In the farrowing crates the sows are taken off their high protein supplements and fed oats for the first week after farrowing. Before weaning time Fisher selects the sow pigs he wants to keep for breeding, and notches their ears to set them apart from those that will go to market. "I like to cross the heavy breeds," Fisher explains. "The pigs I'm raising now came from Duroc sows and a Poland China boar." He keeps a few registered Duroc sows to maintain good blood in his herd and produce the fast growing pigs that can make best use of the abundant feed the farm produces.

At 42, Fisher is considered one of the best farmers in his community. His skill and efficiency at farming, coupled with good times, have enabled him and his family to get most of the improvements and luxuries they want on the farm. On his tenant operated farm there is a new double corn crib 40 feet long and 30 feet high. The corn crib is the symbol of Iowa, but Fisher's is a bigger symbol than the average. The crib, built at a cost of $11,000, will hold 6,000 bushels of corn and another 6,000 bushels of small grain or shelled corn in the bins above the aisle that runs between the two sides of the crib. "That," says Fisher, "is what I consider a good corn crib. Now I want to build another just like it on the home place." He feeds all the corn he raises and, in an off year, buys some on the market.

His plans call for building the next crib in 1951, and at the same time he expects to build a garage for the family's two Buicks, and a combination shop and machine shed. The finishing touches are being added to a remodeling job on the front of the Fisher home. Two rooms were extended and large picture windows installed in each of them. "Now," says

Mrs. Fisher, "perhaps visitors will use the front door instead of the kitchen door."

The Comforts of Home

The Fisher kitchen includes most of the gadgets which farm wives have long wanted in their kitchens. The sink is surrounded by ample cabinet space. If there is an electrical appliance which Mrs. Fisher doesn't own, it's one she doesn't need. Here Mrs. Fisher prepares the foods with which every Midwesterner is familiar, food more nourishing than fancy, with quantity stressed as much as quality. There is an occasional cornbread and corn cakes for breakfast, but the Iowan is no more corn-fed than the New Englander, the fiction writers notwithstanding.

The kitchen is an efficient work shop where Mrs. Fisher can complete her work rapidly and still have time to care for her flock of 200 hybrid laying hens, and attend meetings of the several organizations to which she belongs.

The chances are good that Rodger and Tom will some day own farms. They have been learning the fine points of farming since they were old enough to follow their father into the fields. For several years they have raised stock of their own, and for the last three years they have both paid individual income taxes.

The boys work in partnership, "Last year we raised 21 head of feeder cattle," Rodger says. "And this year," Fisher adds, "they want to raise twice as many." The boys sold their finished steers at a profit of about $150.00 per head.

When Rodger went to Iowa State for a six months short course in agriculture last fall, Tom agreed to take care of their jointly owned stock. Next year Tom will take his turn at college and Rodger will handle the farming for both of them, and help his father. "That way," says Fisher, "they can go to school as long as they want to and we'll still get the farm work done. I'd like for them to get some college training. I never had time because I had six sisters and no brothers. The girls all went to college, but I stayed home on the farm."

Most Iowa farm boys expect to stay on the farm and Rodger and Tom Fisher are not exceptions. Rodger is county president of the 4-H, and Tom is president of the township club. Rodger

RAYMOND FISHER hired a carpenter to build 10 farrowing crates at a cost of $45 each. Pigs can escape the sow on all sides. During farrowing season one crate often accommodates three sows for two weeks each. "They save space, pigs and work," Fisher says.

IN IOWA farmers beat a path from the market to the bank, for times are good. Farmers sit on the board of almost every Iowa bank. Befitting its position as the hub of the farmers' universe, the directors of the bank at Coon Rapids erected this classic facade, but made a quick bow to local design by backing it with a suggestion of the wild west false front. It occupies the busiest corner, casts a sidewise, snobbish glance at Plumlee's ice cream parlor, also with a false front.

has earned a State Farmer degree in the FFA; both play in the school band and sing in the chorus. During the summer Tom plays with a dance band. "They're pretty good at their music," says Mrs. Fisher, "but I still can't figure out where they got it."

Iowa farmers seldom have a bad year because they practice general farming. If one crop fails there is another that doesn't. "My cousin was over from Kansas not long ago," Mrs. Fisher recalls, "and if their wheat fails their year is all bad. It's not like here. We always count on a pretty good year."

The agricultural experts at Iowa State College at Ames, who have made a long time study of farm income in Iowa point out that the state has never had a complete crop failure. Some times drought, excessive rain or hail may bring them close to disaster and farmers worry about it, but in the long run they have statistics on their side.

In some sections the Iowa countryside tends to be monotonous. As the traveler speeds past the endless fields of tall corn, the white farmhouses seem as alike as two cups of water. There is generally a grove of trees around the house, a lilac bush and the kitchen garden. Designed and built by country carpenters, they are comfortable, functional, dull and unimaginative. The barn, corn crib, and tool shed are usually painted red. The fancy barn is a rarity in Iowa, for the barn was designed to do its work with the least outlay. This is the American Gothic that Grant Wood, a native of Anamosa, Iowa, recorded so successfully on numerous canvases.

The basis of Raymond Fisher's success and that of the other 200,000 farmers in Iowa is the fertile soil they cultivate. Iowa is a prairie state. In pre-historic times only 20 per cent of its area was forested: the remaining land was covered with tall grasses that fell each autumn, rotted and added to the humus in the soil. Previous to that, however, Iowa was in the path of the four great glaciers which slid down from the north. The effects of these ice sheets have a very real bearing on farming in Iowa today.

The Soil of Iowa

The latest of the glaciers dipped into the north central part of the state and it is that part of Iowa which leads the state in corn production. The land is black, and level to gently rolling. The top soil is deep and porous. This is the part of Iowa farmed by Raymond Fisher near Grand Junction; it was the last Iowa land settled by farmers, for before farming could be successful there the land had to be drained. Today it is laced by master drainage pipes installed by the counties, with feeder branches installed by the land owner.

But not all of Iowa is flat and monotonous. In the eastern and western sections of the state is rolling land where cattle and pasture prosper, and in the southern counties are rugged hills noted more for their beauty than for their productiveness. Yet in the hills of southeast Iowa much of the soil is still dark and fertile far up on the hillsides. Geologists explain this

happy situation as the work of winds that picked up fertile soil from the river bottoms along the Missouri river on the west and carried it to the southeast, a fortunate example of pre-historic wind erosion.

Coupled with Iowa's fertile soil is an ideal farming climate that provides an average frost free growing season from the second of May to the seventh of October. And during this growing season 71 per cent of the annual 32 inch rainfall feeds the growing crops. When the weather acts normal in Iowa a good crop is assured and the Iowa farmer wears a smile on his face. But there is much talk about the weather because the Iowa farmer knows, like farmers everywhere, that the weather can be his undoing. In the late summer of 1950 farmers were worried about the corn crop, and not even war could bring the Iowa farmer a more real worry. Weather had been cool and the corn matured late. By the first of September it was touch and go; an early frost could have made a damaging dent in the corn crop; ten days of warm weather could have produced the usual crop of 65 bushels to the acre average across the state. Then the cool weather let up. The sun warmed the fields, and smiles returned to the faces of people on the farms and in the small towns of Iowa. By the last of September the farmers were breathing easier, for the weather had ended the growing season on their side and the Iowa farmer once again harvested his bumper crop.

Where Corn Is King

In Iowa if the corn does well the whole state does well, for Iowa has honestly earned her reputation as a corn producing land. While native Iowans, in true Chamber of Commerce style, may speak in superlatives of their corn growing ability, they do speak the truth. Year after year, about one acre out of three in all of Iowa is planted to corn. In every county of the state corn is the principle farm crop, and most of it is fed on the farm and marketed as meat. Iowa grows ten of every hundred bushels of corn grown in the world.

A hundred bushel yield is not unusual. The farmer who makes it may casually mention it to his neighbor, but he won't go to town and brag about it; it happens too often. If his yield falls below 65 bushels to the acre he tells no one, probably not even his wife.

Hogs Unlimited

And if corn is king in Iowa, the hog is the crown prince. With the least outlay of capital, labor and risk, hogs convert more than half of Iowa's corn production into a cash meat crop. More than 40 percent of the state's total farm income is from the sale of hogs, and it is little wonder that, like the corn crib, the hog is another symbol of Iowa agriculture. For almost 60 years Iowa has been the nation's leading hog producing state. Not only has the Iowa hog lifted many a mortgage, but he has bought his share of bathrooms, tractors, and automobiles.

Iowa farmers produce their hogs with a minimum of labor and fuss. They don't worry much about sanitation, even at farrowing time. They give the farrowing house a quick cleaning and spread a layer of bedding on the floor, but few farrowing houses are washed or sterilized in the McClean County, Illinois, manner. As long as he is having no trouble with sick pigs the Iowa farmer seldom worries about changing his hog management practices. "I haven't had any disease trouble since I quit going to sales," one farmer said. "Now I just settle for whatever my sows can produce. It's safer than taking a chance of bringing in diseased animals."

(Continued on page 109)

IOWA'S TRADE MARK might well be a field of corn for one acre of every three is planted to corn each year. Between the last cultivation and the beginning of the corn harvest there is a lull in field work and farmers mow weeds (middle), repair fence, and put up the last of the hay. The farm wife's work, however, is not seasonal. Many Iowa farm kitchens, like that of Mrs. Raymond Fisher (bottom), are pleasant work shops complete with modern fixtures. Iowa's corn is marketed in the form of beef and hogs (right). Forty per cent of all the corn grown in the state goes to market on foot as pork.

ICE FISHING

Ice fishing is mainly for the meat hunter. As a sport it is too rugged for all except the hardy northern farmer.

WHEN the last tourist goes home and the harvest is in and the world is locked tight in the icy clutch of winter, the Northland farmer goes fishing.

His equipment is simple and inexpensive; an ice chisel, a fish stick, a bucket of minnows, and a scoop. If he is a Michigan fisherman he may have a shelter with an oil heater: if he happens to live in Minnesota he may want a shelter, but the law says this is illegal for line fishing. However, if he is a Minnesota spear fisherman, he may build himself what is known as a dark house, a shack with a window or two which throws the light into the fish hole, permitting the fisherman to look down through the translucent water at his prey. The best way to spear fish is to lie flat on the belly with the eyes near the surface of the water in the hole. This also conserves body heat, offering less surface if a blizzard happens to be blowing. Old hands at spear fishing say that since the water immediately below the ice is not lower than 32 degrees, some of this "heat" is transmitted through the ice to the body of the fisherman.

Both line fishing and spear fishing require that a hole be dug in the ice. This is done with an ice chisel which will cut a 6-inch to 8-inch circular hole through 30 inches of ice in a few minutes.

An ice chisel is generally home-made from a short length of pipe with a sharpened blade welded to one end. A rope is tied to the other end and looped over the fisherman's wrist. This is a safety precaution to prevent the loss of the chisel through the hole. The blade of the chisel is usually a section of an old car leaf-spring sharpened with a bevel on one side only. An ax or saw is never used. However, there are some commercial augers on the market that work quite well.

A tin scoop is used to keep the hole free of slush and new-forming ice. The scoop is a dipper full of holes, the kind used by grandmother to skim the foam off applebutter.

Fish sticks are used instead of the conventional rod and reel. A fish stick is a short piece of metal or wood, often a broomstick, with an ice pick or sharpened nail driven in one end. The other end

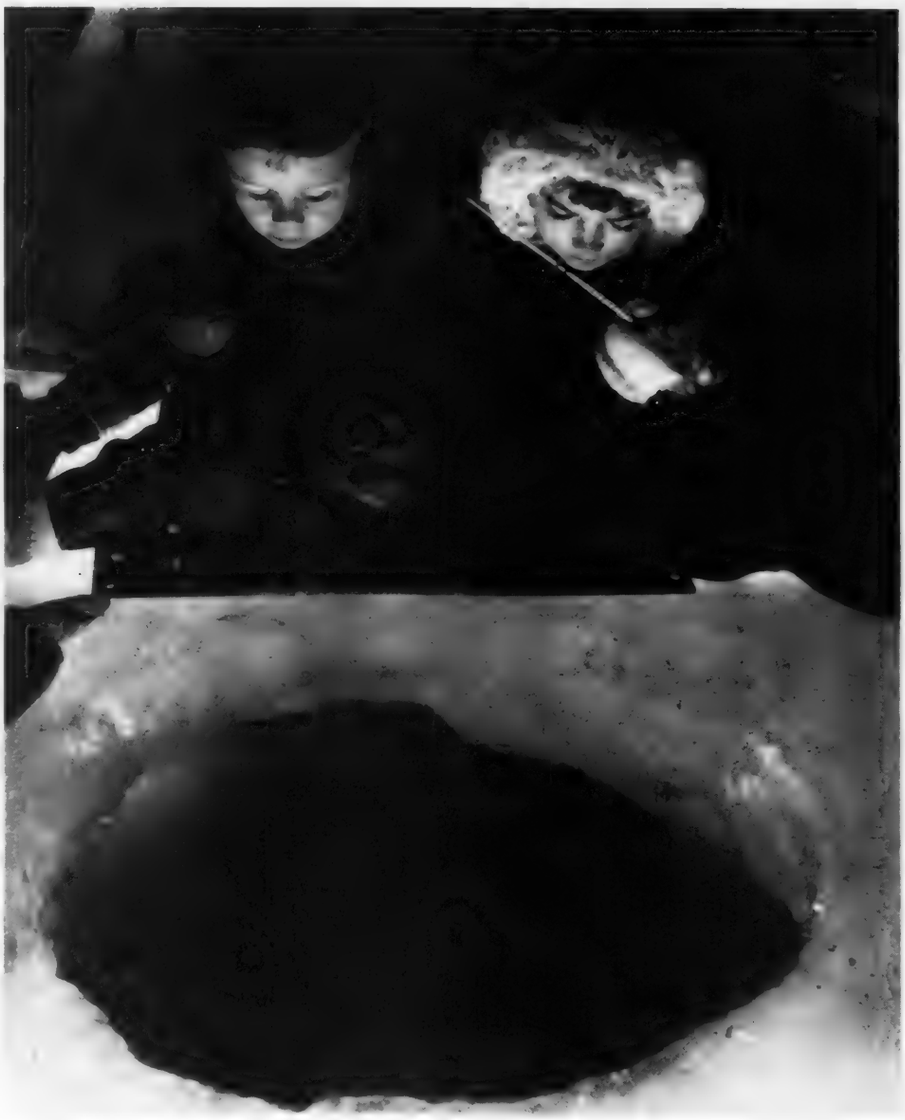
may be fitted with a rubber bicycle handle grip or be wound with tape. The grip helps to push the stick into the ice to hold it in an upright position. It would be impossible to wind the line on a reel because the water soaked line freezes solid as it is taken out of the water. Two winding knobs or pegs are used to hold the reserve supply of line. A pencil type bobber, easily adjusted for different fishing depths, and a small hook with bee-bee shot for a sinker make up the fish stick.

Minnows are usually used for bait, and are procured from sports shops and bait dealers. Worms would be fine for bait but they are unobtainable in winter.

Crappies, perch, sunfish, walleye and northern pike are taken through the same hole with the same bait and procedure. Bass also are caught but must be returned to the water because they are out of season. Fishing near or over weed beds, where the fish congregate because of the oxygen supply, is best in winter.

Ice fishing is cold, slow, and tedious, and there is none of the thrill which the summer fisherman gets when a big one strikes. The fishing is best at sunrise and sunset. The fish takes the minnow lightly in its mouth, and slowly swims away. If he encounters too much resistance on the line he lets go the minnow. For this reason a pencil bobber, which offers little resistance, is used. It is very important that the fisherman keep a close watch on the bobber because signs of a bite are very slight.

U. S. surplus flight clothing is the most popular dress. Fires and stoves are not much use in zero weather or a strong wind unless you also have a shelter house, which is not permitted in all states.



A FISHERMAN'S VIEW of the fish. On the opposite page is a fish eye view of the fisherman; Joe Clark submerged his camera in the hole to take this photograph.

IN MICHIGAN a fisherman can be snug and warm in his heated shack, which he moves from spot to spot on the sled. The shack and heat are furnished free.

Minnows are generally kept in regular minnow buckets, but some of the old-timers prefer to keep them in a pint whiskey bottle in a hip pocket. The cold keeps the minnows in a sluggish state and they require no change of water, which body heat keeps from freezing.

The best place to fish is where everyone else is fishing. Take your kit right into the midst of the gang and start chopping a hole. As soon as you get your line set in one hole, start chopping another. This serves two purposes; the chopping keeps you warm and two holes double your chances of getting a fish.

You fish deep, just a few inches from the bottom of the lake. You may fish for several hours with no luck and then catch a half dozen in a few minutes. They bite in cycles.

One rarely finds women fishing through the ice; the cold weather discourages most of them. On the other hand, kids enjoy it,

(Continued on page 90)

THE BRAHMAN CROSSES

BY S. A. GODDARD

BRAHMAN CATTLE are no longer a question mark for the South. Taken straight or in mixture with the English breeds, they are firmly established as the solution to the heat, pest and grain feed shortage problems; and they are the best utilizers of the South's plentiful supply of year 'round grass.

But what about their performance in the North? How well do they do in the feedlot in northern winters; and can they compete with the established English breeds? And what about the crossbreeds and their place in the national cattle picture, on the western and southern ranges and in the North?

Since Farm Quarterly published its first article on the Brahmans five years ago and asked the same questions, the breed has gone a long way in the North and many of the questions have been answered. Indeed, the enthusiastic proponents of the Brahman go so far as to predict that in another generation 75 per cent of the cattle butchered in this country will have some Brahman in them.

Range cattle producers in the United States and Canada are mighty concerned over what they call "the deterioration" which our beef breeds have undergone in the past two decades. They claim that range cattle today do not measure up to the ranchers' requirements. The cattle have become soft; their bones are smaller and more refined; they often lack a rugged constitution; they weigh less at market age; and, worst of all, they are losing their ability to rustle a living under difficult range conditions.

Many ranchers claim that show ring standards have contributed to this condition with the result that purebred breeders who supply the bulls used by the ranchers are no longer in a position to offer the large, rugged types of sires needed.

Casting around for a remedy, progressive cattlemen see some hope in the breeding programs with Brahman cattle started some 40 years ago in the United States by a few farsighted pioneers who have already produced one new breed and a number of promising cross breeds.

Just what sort of an animal is this critter with the droopy ears and the hump that makes him look as if there might have been a camel lurking in the shadow of his ancestral tree?

To begin with the Brahman hadn't changed much since the Hindus domesti-

SANTA GERTRUDIS

BEEFMASTER

BRANGUS

cated him several thousands of years before the Christian era. No improvement had been made until American cattlemen started to cross breed him 40 years ago.

To be sure, the mule deer ears, the long sad face, the loose skin, the hump, the draped dewlap, the deep-chested body and the slender whip-like tail are all characteristics which keep the Brahman out of the beauty classes, but through the years, famine, heat, disease and the burden of the plow have made the Brahman strong and vigorous. He lives where other cattle fail.

Like a horse, the Brahman sweats through his hide, which the English breeds can not do. This is the advantage of the Brahman's loose skin, which serves him as a radiator. Due to the large number of sweat glands in the excessive skin

THE CHAROLAIS, a French breed, new in this country, has great possibilities in crossing with both Brahman and English breeds.

surface, the Brahman can endure greater heat than the other breeds. When the sweat evaporates a yellowish-brown substance remains on the surface of the skin which tends to discourage flies, ticks and the dangerous screw worms.

The Brahman's reputation as a wild critter originated in the rodeos, and is a slur on the docile temperament of a fine animal. It does have a mysterious temperament which is not easily understood by those who have handled only the British breeds. The Brahman is wary and sensitive and a quick movement or shout will send him high-tailing to the back of the pasture. Buckaroos in Texas learned long ago that they could lead a Brahman but they couldn't drive him.

One characteristic which the Brahman exhibits to a greater degree than other breeds is the ability to survive. When grass is short and water is scarce, the Brahman is able to keep in better condition than other breeds under similar circumstances.

Cattlemen have discovered that cows of Brahman blood make good mothers, don't suffer from pink eye and cancer eye, have practically no udder trouble, and give a good supply of milk the year round. Their calves are notorious milk thieves and it is claimed that once a newborn calf gets a bellyful of milk it will not starve to death as long as there is any cow in the pasture giving milk.

As to their use as a beef breed, only the most optimistic believe that the purebred Brahman will or can challenge the established breeds for many years to come.

Cattlemen have always hoped for the ideal breed, but their demands have always been too ambitious to be filled by any one breed. The ideal breed will probably be a cross in which the best qualities of several breeds will be concentrated. That is where the Brahman comes in, for it is in crossbreeding that he shows his strength and adaptability for northern pastures and feedlots, and the stamina and meat producing ability for the ranges.

Since the first Brahman bulls were imported nearly 100 years ago, this "Holy Cow" has been crossed and criss-crossed with the British breeds of North America. There seems to be an unlimited choice of breeds for crossing with the Brahman as very desirable hybrids have been secured from all, but the Shorthorn base seems to "nick" a little better than the others. However the Federal Government is doing well with the Aberdeen-Angus.

The King Ranch, Kingsville, Texas, early became dissatisfied with the breeds of cattle they had been raising. In their

A CHARBRAY CALF, a Brahman-Charolais cross, is a hefty, fast-growing animal.

early operations they had raised Longhorns, chiefly because they were about the only breed available. The Longhorns did well on the range, were hardy and good breeders, but they were small and wild and did not produce good beef.

Something different was needed. Something that would grow more beef per acre and produce a higher quality of meat.

Under Robert Kleberg, Jr., they crossed Longhorns with Herefords and Shorthorns. The results were not impressive. Under southern Texas conditions the Hereford cross was more desirable on the better pastures — they multiplied faster, fattened quicker and sold for better prices. But on the poorer pastures or open range, the Shorthorn cross grew larger, suffered less from disease, and produced fewer small-boned calves than the Hereford cross. But, during long droughts the Shorthorns suffered and both breeds showed the results of attacks by mosquitos and flies after rains. And worse, screw worms almost ate up the young calves while ticks, lodging in their ears, left them wide open for screw worm infection.

Purebred British breeds, Hereford, Shorthorns and others, came up short of expectations. They suffered particularly from the heat.

THE BRAHMAN COW is a superior mother. Calves weigh 500 lbs. in 6 months.

Shortly after the turn of the century and the introduction into Texas of the Brahman breed, Tom O'Connor, a former partner in the O'Connor-Pierce Estate importations of Brahmans around 1906, gave the King Ranch an enormous half-breed Shorthorn-Brahman bull. The bull was turned into pasture with Shorthorn cattle. All his male offspring were castrated except one red bull calf. Then all the heifers were turned back with Shorthorn bulls. The steer calves developed into big-boned fat cattle right off the grass.

Kleberg was quick to notice that there were no "dogies" or stunted cattle developed from this cross, and they were the best range cattle that he had seen on the ranch for some time. These crossbreeds seemed to offer a possible solution to the King Ranch's range cattle problem.

In the fall of 1918 all the female offspring of the O'Connor half-bred bull and his son were rounded up and placed in a small, blackland, mesquite-grass pasture by themselves. Then the best and fattest Hereford cows were cut from a large herd of purebred Herefords and placed in the same pasture for more accurate comparisons. The crossbred cattle, while of necessity not as uniform, were, in every instance, heavier and fatter cattle.

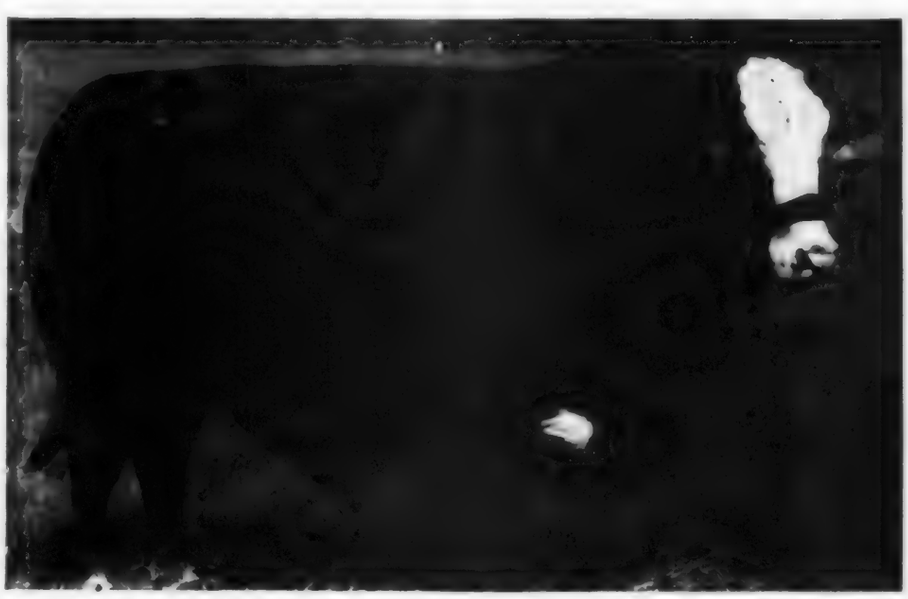
These comparisons and observations were made for about 10 years when they decided to expand the project to a much more extensive scale. Fifty-two of the very best three-year old Brahman bulls were selected from the Pierce Estate herd, managed by A. P. Borden. The bulls selected were three-quarters to seven-eights pure Brahmans.

Considerable experimentation, observation, inquiry and investigation then determined what percentage of Brahman blood would produce the best range and market animals. They finally settled on three-eights Brahman and five-eights Shorthorn blood as the most desirable combination. This blood percentage appeared to give the maximum size, hardiness, ability to fatten, high dressing percentage, resistance to heat and disease, and it practically eliminated the hump.

The important matter of blood mixture decided, they went to work. They divided the 52 Brahman bulls into eight different herds containing altogether 2,500 Shorthorn cows. Later they replaced these bulls with better ones sired by their own high Brahman stud. After two or three years of further breeding they developed a bull, which they promptly named Monkey, who seemed to have all the desirable characteristics they wanted in their new breed and who seemed to be able to transmit these characteristics unusually well to his offspring.

"Monkey" became the head of the new herd. By using him and his sons and grandsons, as well as his daughters and granddaughters, the Santa Gertrudis breed emerged. This name was taken from an old Spanish name for the ranch. It is

(Continued on page 122)



THE BRAFORD, a Brahman-Hereford cross, retains the white face of the latter.

CHARLIE KIPPEN— *sheepman*

BY LOUISE GERDTS

PINK-CHEEKED, bandy-legged Charlie Kippen runs a herd of 4000 ewes and owns 15,000 acres of the prettiest mountain grazing land you could lay eyes on. At 48, he's a proud father ten times and three times a grandfather; in the snug Utah town of Morgan he's a Bishop of the Mormon church. As he puts it, "I'm so doggone busy I haven't the time for moping or getting in trouble."

Kippen's genuine interest in sheep would amaze a cattle man. And he is not only fond of them, but he respects their intelligence.

"Most people think sheep are stupid, but they're not," he declares. "They're downright smart. Why, sheep are as individual as us humans in their appearance and personality. Even their voices are as unlike each others as yours is different from mine. And just like us humans they have a certain position with the rest of their kind. Some are leaders of the herd and some bring up the tail end. They arrange it amongst themselves so that some always feed on the right side of the herd and certain ones feed on the left all of their lives. That way there's no confusion."

His herds are on the range the year 'round which involves considerable travel and handling. From November through March they are wintered in Nevada; in April they are shifted by train to spring lambing pastures near the Great Salt Lake at Grantsville, Utah; two months later they are trucked to the home ranch at Morgan to summer on the mountain range.

Home on the Range

The sheep cycle begins in the late fall. The year's lamb crop has been marketed, and the ewes, down from the summer pasture, are shipped by train to winter in the vast, bleak Nevada desert on Taylor grazing land. Here for a small fee the herd of 4000 will chomp over approximately 100,000 acres of the 750,000 acres of public land the herd shares in common with herds belonging to other sheepmen. For the winter months Kippen consolidates his four herds into two, and two of the four herders become camp tenders. The Secretary of Interior, who controls the Taylor grazing land, places a rigid limitation on the number of sheep that are permitted on the range, but once the herd is admitted, the range is open to "first come first served," and competition for the best feed is hot. Herders usually make a grand run over the entire area to catch the good grazing first and then recross it for the second best. It is the camp tender's job to move camp and locate the best sites, for once camp is set up the herder has established his right to the land around it for his herd. "A good camp tender gets the draw on neighboring sheep camps by finding good sites and moving to them fast,"

OUT ON THE RANGE, Kippen's horse is his partner and his best friend. Riding herd over 200,000 acres of range has put a permanent bow in Kippen's legs.

WOOL ON THE HOOF is driven to the mobile shearing sheds. Four thousand ewes will be shorn in one day in a giant clipping bee. All hands pray for fair weather.

ON THE LAMBING RANGE the herd moves slowly over 10,000 acres of thinly grassed upland. The lambs are born almost on the move and begin their lives traveling with the herd. They are docked and the ewes are shorn here on the lambing range in the spring. Black-faced lambs were sired by mutton type Suffolk bucks and are not held over for the breeding herd.

Kippen says. "Why he'll pull stakes in the middle of the night, if he has to."

Out in the desert in November when the nights are long and cool, the bucks are put on the ewes at the rate of two rams to 100 ewes. Kippen figures his coming lamb crop 25 per cent for wool and 75 per cent for mutton. The lambs for wool are sired by purebred Columbias, which Kippen uses on his purebred Rambouillet ewes. Every two or three years he buys a few Columbia rams as replacements at the National Ram Sale in Salt Lake City. To produce the mutton lambs, he uses Suffolk bucks which are products of his own herds. He keeps only wool type ewes for his breeding herd by selling off all black-faced ewe lambs each year; the black face is a sure sign of Suffolk blood. The average breeding ewe stays on in the herd for five or six years: some have actually lasted 12 years.

Along toward the middle of February when feed gets short in the desert, Kippen starts feeding concentrates. He believes that ewes in good flesh at lambing time will produce healthier lambs with less difficulty than those wintered without supplementary feeding. Kippen, himself, swears by pellets and from February until April each ewe gets between a quarter and a third of a pound of them each day. Even in 1949, when the hard winter made national news Kippen managed to get pellets in to his snow-bound herds, and they came out with better wool and heavier lambs than ever before.

Maternity Ward

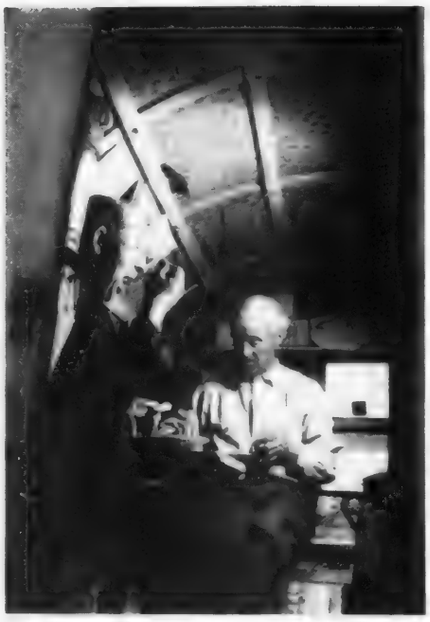
After trying various spring lambing pastures, Charlie Kippen has finally settled for a 10,000 acre tract on the sagebrush foothills near Grantsville, Utah, which he leases on a long term basis. Except for water, all of which has to be hauled by truck for the herd during the entire two and a half month period, the range offers nearly perfect conditions. And it is only 100 miles from the home ranch, a mere hop-skip-and-jump in this part of the country. About the first of April the entire herd of pregnant ewes is moved to the Grantsville range. This is when the sweat and toil of Kippen's sheep season really begins.

Spring lambing is the busiest and most important time of the sheepman's year; the outcome of the lambing spells his profit or loss. Kippen usually visits his herders once or twice a week on the winter range or on the mountain in the summer, but during the lambing season he brings his bedroll and bunks with one of the men. During the three-week period when the ewes are dropping their lambs the camp is busier than four maternity hospitals rolled into one. To hold mortality to a minimum Kippen keeps a careful watch over all ewes in labor and rides the range on them as long as daylight lasts. "The yearlings which were just lambs themselves last spring don't seem to know what motherhood is all about, and have to be helped. That keeps me humping," he says. This personal care keeps the lamb mortality rate down to about four per cent. The overall lambing figure for the entire herd is around 110 per cent, which is considerably higher than for most range sheep. Of his ewes he can expect that five or six per cent will not produce: the barren yearlings he does not count.

On the Grantsville range where the lambing takes place, the sheep are started in the foothills and move slowly down to the flatlands, cropping the sparse grasses of this arid land as they move. It will take about a month for the herd to reach the end of Kippen's range and by that

DOCKING THE OLD FASHIONED WAY (top) was done with masticator and knife; castrating was done with the teeth. Now, Kippen uses the bloodless elastrator. In a mountain corral (2nd from top) the herd is divided into four bands for the summer. Docked lambs (3rd from top) wander through a pile of severed tails searching for their mothers. Lambs and ewes are trucked (bottom) to their summer pasture.

ENTWINED HEARTS CARVED ON AN ASPEN TREE hold tender memories for the Kippens. Now they have ten children; and four grandchildren will soon be doing their own carving. Keeping such a large family fed and in clean clothes is a full time job for Mrs. Kippen who bakes bread every day and keeps two washing machines going when she does the laundry. All the kids, from the oldest to the twin girls, the babies, are expected to do their share of the work . . . and they do it.



A SNUG HOME on wheels is the herder's wagon. Kippen often stops for a meal with the Basque herder as he makes his rounds of the camps delivering supplies.

COLLEEN KIPPEN HAS A PET LAMB, of course, but she also has a pet fawn and a pet horse and all the other pets a 13-year old ranch girl accumulates. Her chores include feeding chickens, helping with the housework, and tending her twin sisters.

time all of the lambs will be born and will have becomed seasoned travelers.

Each day of the lambing season from dawn until way past dark the men work at a dead run—cutting out ewes in labor from the rest of the herd, keeping the sheep on the move for new grass, watering, assisting in difficult births, picking up orphans, and, most important of all, getting a lamb on every ewe. Kippen explains the importance of this last in terms other businessmen understand. "A ewe without a lamb is like running a truck deadhead: she's completely worthless and is only kept with the hope that next spring she may have another lamb that will live."

The men go to great lengths to keep new lambs from being separated from their mothers and to place orphan lambs with a foster parent. A first-time mother who is flighty and excitable is staked to a sagebrush near her newborn until the lamb has begun to suckle; and ewes are banded together according to the strength of their lambs, so that they won't travel too fast for a few of the little critters. When a lamb dies at birth, Kippen or the herder hastily takes a nearby orphan, called a "bum" by sheepmen, and rubs it on the dead lamb so it will take on the dead lamb's odor long enough for the foster mother to recognize and accept it. If there is time, he skins the dead lamb and wraps its coat around the orphan. If a foster mother cannot be found immediately for the orphan, the little bum is taken by truck or horseback into camp where it is penned in a small manger with a ewe which has lost her lamb. Several times during the day the men "hold the lamb on the ewe" until she lets it suck voluntarily, which is the sign that the two can be turned back with the herd. All these tricks are time-consuming and back-breaking, but they save lambs, and Kippen ends the lambing season with very few bums.

When the lambs are a sprightly two or three weeks old they are docked and the males castrated. Until this spring Kippen used the old time methods of docking—a masticator to break the tail bone and a sharp knife to nip it off, and castrated by slicing the scrotum and pulling the testes out with his teeth. The operation also included snipping the ear for identification and branding the animal with a paint stamp. With helpers in an assembly-line formation, he could handle 250 lambs in an hour. Though branding and ear marking are done in the old way, this year Kippen began using the new elastrator for docking and castrating. An elastrator is an instrument which slips tight rubber bands over the tail and around the scrotum and testes. The band cuts off the circulation and within a few weeks the tails and scrotum drop off. For the first half hour after the elastrator is put on the lambs jump around in a frenzy, but after the circulation has completely stopped they seem to feel no discomfort. "This new method makes the prettiest, evenest dock on the tails you've ever seen," Kippen says. "The lamb loses no blood, suffers no shock, and doesn't seem to lose any weight with this method of docking. Of course, we don't have a feed of mountain oysters like we used to, but I guess we can get along without that."

To conclude spring maneuvers, Kippen contracts with a Mexican sheep-shearing outfit to fleece his 4000 ewes. One night Moses Reyes sets up his camp of 32 men on the edge of the range and by sundown the next day the herd has been shorn. Reyes travels a circuit from Texas to Montana with a specially rigged truck that allows 16 sets of electric shears to be operated at the same time. Since Reyes is paid by the head, it is necessary that his workers be fast and able. An expert shears the fleece, which averages nine pounds, from a ewe in three minutes flat and the outfit runs 300 head through their barber shop each hour. The greatest concern at shearing time is for the weather to hold. If it starts to rain the shearing must be postponed until the sheep have dried off. If shorn when wet a sheep may contract rheumatism which often develops into a deadly pneumonia.

The wool is sold on the range to a buyer who judges its worth by length, cleanliness, and general feel. This year Kippen sold his wool for 60 cents a pound, which was midway between the top and the floor of the market.

Home in the Mountains

What with lambing, docking, and shearing, a sheep's life is anything but idyllic in the springtime. Neither, for that matter, is the sheepman's. It is with a feeling of relief that the ewes and lambs are loaded into rented trucks and hauled to their summer range where they begin working their way up the mountain for five months of grazing. During these months Charlie Kippen looks forward to some let-up in his work and finds time to enjoy his family and to tend some of the other irons he has in the fire.

The Kippens' ranch home is as neat as

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ON THE LORD'S DAY Bishop Kippen conducts meetings of the Mormon church.

GRAIN FOR SHEEP is grown on 150 acres of the home ranch by Kippen's oldest son.

SUNDAY DINNER brings the clan together. One son is away, serving as a missionary.

RESEEDING

BELIEVE IT OR NOT, a faithful reproduction of a field of crimson clover in all its glory. A thing of beauty on any farm, it is also fine cow feed, and it will reseed itself next year.

CRIMSON CLOVER

BY ROBERT S. GRAY

A reseeding legume with many good points, Reseeding Crimson Clover fills a gap in the year around pasture program in the South.

THE old-time lightning rod salesman knew tricks about selling, but the crimson clover boosters of the South are making him look like small potatoes in the selling game since they took up the sponsorship of this winter-growing legume. In a little more than two years they have made this obscure crop an agricultural ball of fire. Now everybody either knows about reseeding crimson clover, or wants to know about it.

It's quite easy to get enthusiastic about crimson clover, for it stands up well under most claims made for it. It is a profitable seed crop, it provides winter grazing of the highest order, it is a soil builder, and it reseeds itself better than any common legume.

It has its good points but it is by no means the miracle crop some boosters claim it is.

Growers of the clover don't agree on who gave the initial push to the reseeding strains, or even where they were first found. T. J. Watson, an elderly farmer in Talladega County, Alabama, is known to have cultivated reseeding crimson 20 years ago. He passed seed to his neighbors and it kept spreading. In Franklin County, Tenn., John Ruch is reported to have first planted crimson in 1892.

Southern extension service people will tell you that E. A. Hollowell, senior agronomist with the Agricultural Research Administration, helped nurse at least one reseeding strain to health and prosperity. Hollowell sparkplugged the Dixie strain in the late 30's until it was perfected and endorsed by his colleagues in the South. The Autauga, Dixie, Auburn, and Talladega strains are the most popular everywhere today.

The first crimson clover "festival" was held in Winchester, Tenn., in 1936. The Autauga (Alabama) Reseeding Crimson Clover Association plugged the clover in Sunday newspaper magazines, daily papers, weekly papers, farm papers, even some non-agricultural journals. This kind of promotion sold more than 300,000 pounds of the Autauga strain seed in 19 states outside of Alabama in 1949, sold all that could be produced in 1950, and will sell all in 1951.

The seed associations have sold their colorful, high-voltage product to such an extent that it has now spread across 21 states, constitutes a million dollar, million acre industry.

Now, crimson clover is gaining a reputation as the most important winter annual legume of the central U. S., capable of producing good hay, stopping erosion, acting as a cover crop, and improving the soil in addition to its seed producing and winter grazing virtues.

"How good is crimson clover?" Most agronomists will answer: "As good as it's cracked up to be—when properly adapted to soil and climate."

Reseeding crimson does volunteer year after year, but it does not produce rapid riches for anyone overnight. It is a soil builder, like other nitrogen gathering legumes, but it does not suddenly turn a farmed-out cotton patch into a vitamin-packed oasis—at least not without fertilizer and plenty of it.

Like other clovers it has to be properly inoculated, carefully

THE GENEROUS ROOTS of crimson store nitrogen, help soil tilth.

PROFITS FROM CRIMSON have come from high demand for seed.

KNEE DEEP IN A SPRING CROP of crimson seeded 20 pounds to the acre on a fallow field. Crimson demands at least 35 inches of rain.

seeded, grazed with care, and, if seed is desired, it has to be harvested with a shrewd look at the weather, plus a prayer.

When agricultural science caught up with reseeding crimson it began to pay off for Southern farmers in substantial amounts. Seed prices range up to 75 cents a pound. Seed harvests produce 200 pounds per acre. Arithmetic like that sells reseeding crimson.

But worn-out cotton land is being heavily fertilized to produce those big seed yields; no one imagines that any strain of crimson comes equipped with all its own minerals. Substantially fertilized, reseeding crimson produces bumper seed crops. Livestock gain surprising weights. To these virtues add Chamber of Commerce promotion and we have reseeding crimson clover in this year of 1950.

Past to Present

Reseeding crimson is not new as American crops go. It has been around, volunteering unnoticed, for about three decades. Its predecessor, common crimson, came from southern Europe about 1819. Common names for the clover include scarlet clover and German clover. Since 1880 crimson acreage has grown steadily. The non-reseeding strains also have undergone periodic popularity cycles. Many people were crimson-happy in 1918. There was another boom in the mid-30's. In 1935 no less than 2,000,000 pounds were planted. Between 1940 and 1945, U. S. farmers planted between 6,000,000 and 18,000,000 pounds annually, and there is no telling how much they handed across pasture fences to each other.

Crimson clover has leaves and stems that look like those of red clover, but has rounded leaf tips and more hair on stem and leaf. Planted in the fall, crimson clover leaves branch out from the crown to form a rosette, which enlarges with good weather.

With the end of growth in spring, the flower tips have produced long pointed heads that burst into a brilliant crimson toward the end of the grazing season in April. The seed forms with May's warm temperatures, yellow in color and about twice the size of red clover seed. The plant dies with the coming of hot summer weather. The new crop springs up from the seed.

The reseeding strains of crimson clover look like common crimson clover, and the seed looks the same; but the seed of the reseeding strains is very hard. There has been no pure reseeding strain segregated. Both types will have hard and soft seeds.

Crimson has a tap root system of medium depth, containing nodules for storing nitrogen. Protein content of crimson on good soil and in the early bloom stage, will run as high as 16 per cent.

What Can It Do?

Among other things, reseeding crimson can adapt itself to many soils, can survive the toughest southern winter, stands up well compared to any other grass or legume.

It does best in cool humid weather on sandy loam and some light varieties of clay soil. In gumbo-type black land or on low, poorly-drained land, a crimson planter may produce a weak crop or no crop at all.

Reseeding crimson gets along well in the acid soils of the southeast and the hodge-podge of soils in cattle-conscious east Texas. It reduces soil and moisture loss to a negligible figure. It is being grown successfully as a green manure crop in the extreme Northeast, as well as parts of Michigan and Minnesota. Winter grazing and seed production are possible through the area extending across Kentucky, southern Missouri, southern Indiana, and even into a few counties in Ohio. Here, however, the seed must be adapted to severe winters and must be sown early in fertile ground, preferably in August. While crimson seldom if ever winter-kills in the South, it also does not react favorably to prolonged fall drought and at planting time drought is fatal. In the north it does not reseed.

Some California areas now grow re-

seeding crimson in small quantities. So do the warmer regions of Kansas, Oklahoma, Maryland, and Virginia. But lack of rainfall—at least 35 inches are necessary—rules crimson out for Arizona, New Mexico, most of west Texas, and other western states.

Putting Crimson to Work

Reseeding crimson clover needs a firm foundation. Enough soil moisture to sprout the seed and firm ground in which to anchor the plant are big factors in establishing the clover.

Southern planters, using crimson for the first time, find it does best following a grain crop. Better stands result when it's drilled one half inch deep, instead of broadcast; when a cultipacker is used once (twice is better); when the seed is put down just as fall rains begin.

One often sees a crimson clover planter seeding his pasture during a drizzle in September or October. He'll be cautious, too, about seeding between the rows of cultivated crops. Row crops will shade the crimson seedlings and sometimes take too much moisture. Planted in wider-spaced rows, the crimson and row crops make better pasture partners. Crimson tolerates nurse crops but doesn't require them. Ordinarily, the land is lightly harrowed and disced and allowed to settle for a month or two before crimson is seeded. When you ask a crimson grower in Alabama what the clover combines best with, he may suggest sericea lespedeza or possibly kudzu. Ask the same question of a crimson planter in Georgia, Tennessee, or Texas and you may be advised to combine it with vetch, Italian ryegrass, oats, Johnson grass, Bermuda, or perhaps Dallis grass. You'll get many answers. There are may combinations, nearly all good, indicating that crimson is versatile in sharing a pasture. A typical southeast area combination is crimson and sericea.

In Mississippi, many farmers accept as farming gospel the advice of Agronomist W. R. Thompson. He suggests that at least six ideal growing situations exist for crimson With rates of seeding they include: Crimson (reseeding), 20 pounds per acre and three bushels of oats. Crimson, 20 pounds and 25 pounds of Italian ryegrass. Crimson, on pasture sod, 10 pounds. Crimson, alone, 20 pounds. Crimson, on established kudzu, 20 pounds. Crimson, on established sericea, 20 pounds.

Unhulled seed often produces a better crop than hulled seed, but the former is difficult to sow uniformly. Seed dealers will not handle unhulled seed but it is recommended for the farmer who grows his own and wants to save the expense of hulling. Two bushels of the unhulled seed equal one of the hulled.

Among crops recommended for following crimson are sweet sudan and soybeans, for good summer grazing. The soybean follow-up produces a good hay when broadcast or planted after crimson, in 36 inch rows. A grain sorghum does well after a crimson harvest, planted eight to ten pounds per acre in rows.

Fertilization

Generally the farther west you go from the east coast, the more fertile is the land. This is one reason for the wide variation in fertilizers used on reseeding crimson clover.

Southeastern land is acid and often sloping, and while crimson is tolerant of acidity, it usually requires the application of at least a ton of limestone per acre to soils of rather low fertility. Such soils should have a pH of at least 4.5. Crimson flourishes best in soil with a pH of at least 6.0. One standard fertilization in the Georgia-Alabama section is the application of 400 pounds of 16 per cent superphosphate and 100 pounds of potash per acre. One thousand pounds of basic slag can be substituted for the lime and phosphate. In boron-deficient soils, notably in Alabama, this element must be supplied.

Crimson clover, however, does better in medium fertile soils than in those of great fertility. Too-fertile soils will produce a rank growth of plants that "bed down" at maturity, which makes a harvesting problem.

Near the Mississippi river, and west of it, crimson clover has encountered a different fertilizer situation, different soils, a different attitude. In east Texas sand and

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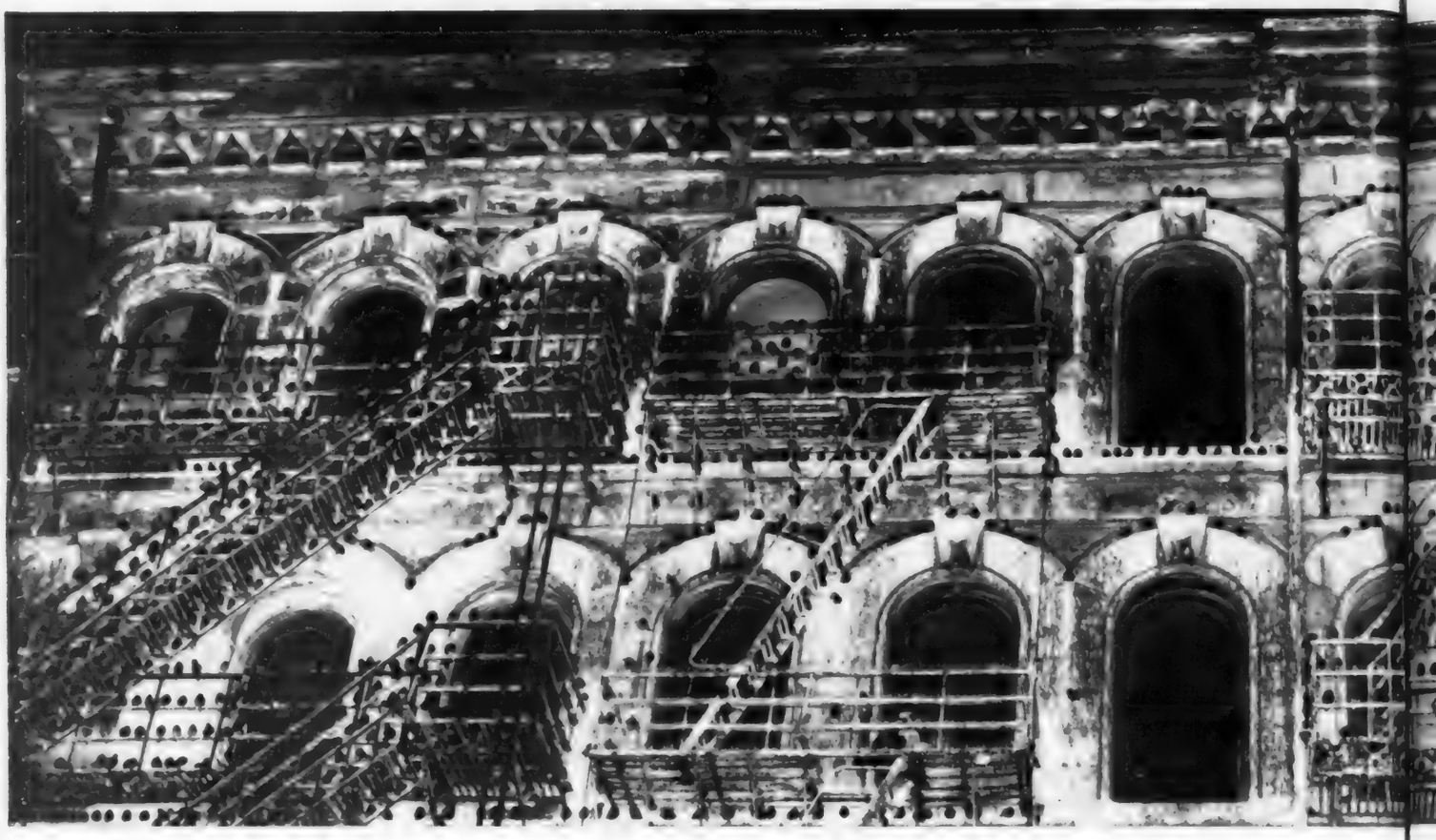
A CORN FIELD seeded in fall. Hogs can be finished on crimson with little grain.

PLOWED UNDER as green manure, crimson supplies adequate nitrogen for a grain crop.



WHEN THE STARLINGS settle on a building for a grandstand and roost, the sidewalk becomes no man's land, pandemonium reigns.

The Case For Starlings

BY PAUL H. FLUCK

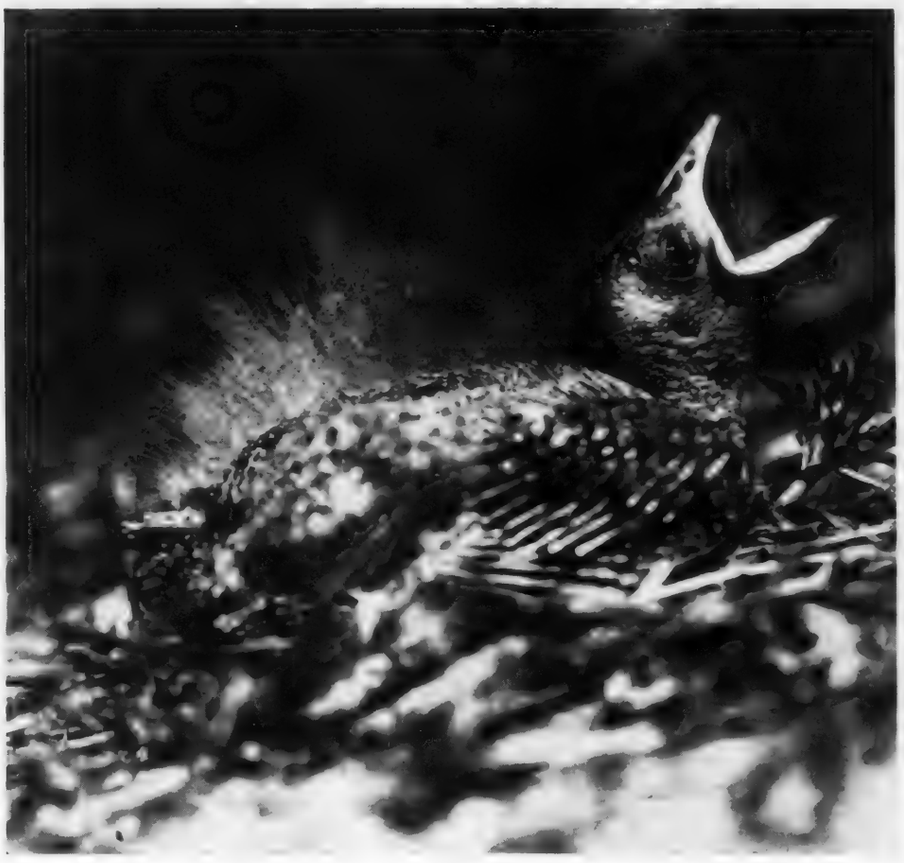
The controversial starling was brought to America to control the English sparrow. They got along beautifully. We're still asking "Was the Starling a Mistake?"

WITH his coat collar upturned against the blustery March wind, Eugene Schieffelin proudly watched the first 80 starlings released in America as they circled over New York's Central Park and headed, like sensible tourists, for the biggest hotel in sight.

Today, 60 years later, Schieffelin would likely not be so proud. He might rub a spot off his hat, swear softly, and disappear around a corner, searching for some quiet place where the starlings cackling and squealing couldn't haunt him.

Schieffelin was the leading member of the "American Acclimatization Society," a group of misguided New Yorkers who didn't know when to leave bad enough alone. Forty years earlier they had introduced the English Sparrow into Brooklyn and Schieffelin secretly hoped that the starling would erase that earlier mistake by holding the sparrow in check. But this was another bad guess. Not until Henry Ford substituted oil pan droppings for horse droppings were the English Sparrows check. So far, only the New England hurricanes have been able to check the starlings.

Today, Schieffelin's starlings bask on Pacific beaches, jostle for elbow room on Canadian Government buildings, and at El Paso their vanguard, according to one observer, crossed the Rio Grande. And on the farm no bird plays the role of Dr. Jekyll and Mr. Hyde quite so adroitly as



THE BABY STARLING has a fuzzy charm which most people say he looses with age. He may live, however, to help control a devastating invasion of Japanese beetles.

the starling. Careful study has determined that the starling's diet is about 42 per cent insects. His overall food habits are just half good and half bad from the viewpoint of the farmer.

At seven o'clock on a June morning, the starling and his mate may be observed digging industriously into the soft turf of the lawn or meadow for beetle grubs and pupae. At ten, with a hundred others, they will be greedily stripping a cherry tree of its pie-making fruit. At three in the afternoon, these same birds will be going over a forgotten straw pile behind the barn, rooting out crickets. Throughout the late summer they will divide their attention equally between ripening apples, pears and grapes, and freshly hatched weevils, grasshoppers, and beetles. The starling is good, and the starling is bad, depending on where you see him.

To understand the ultimate place of the starling in American agriculture, it might be best to look at the starling's record in its ancestoral homeland in Eastern Europe. Across the Atlantic, more than in the United States, starlings will eat small grains. They swarm over freshly planted wheat fields eating the seed as they go. They even consume the buds of sprouting trees. But one notable event stands out in starling history. From 1889 to 1891 there was a great invasion of spruce moths into the forests of Bavaria. Day after day, week after week, great flocks of starlings gathered from miles around to feed on the pupae and the caterpillars of this moth. Meanwhile, the farmers and the gardeners of southern Germany were plagued by more insects than ever before. The agriculturalists of Germany were glad to have the starlings return to their fields and gardens.

How black is this starling? Is he as bad as he makes his roosting place look? Or is this European bird immigrant a blessing disguised?

Starlings in U. S. Senate

Even the United States Senate debated that subject. For hours the starling held the Senate floor one summer day in 1949. Then, championed by Bob Taft from Ohio, and Senator Anderson, the former Secretary of Agriculture, the starling came off the winner. Actually, the victory for the starling was won by an orange-brown beetle which Senator Taft held in his hand. If it had not been for that Japanese beetle a full scale project for the control of starlings in our National Capital might now be under way.

I can remember my first Japanese beetle. I was still dressed in rompers when my father called me to see a detachment of these Japanese invaders chewing a Sunday morning breakfast out of our roses. Thereafter they were not rarities in our garden. Almost everyone in northeastern United States met them soon after that. The Japanese beetle was here to stay, beetle traps, beetle sprays, and beetle quarantines, notwithstanding.

Last summer, as you may have noticed, the Japanese beetle was not the bug it used to be. But beetles don't give up like armies. Beetles chew, reproduce, and metamorphose with a regularity that defies interference. They grant no quarter and ask for none. Nature has provided beetles with a reproductive rate that takes care of the "beetle problem" at least from the beetle's point of view.

But what happened to the Japanese beetle? Why hasn't he been decimating your roses with the same gusto that laid waste to your garden 10 years ago?

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ADULT STARLINGS have iridescent coats and the ability to mock calls of other birds.

THE SOUTH'S NEW TOBACCO

The Indians will never fully understand why the white man wanted to improve on their smoking tobacco. The Indians used the plant mainly for ceremonial purposes, and the stronger the tobacco the better it served. But the white man wanted a milder smoke, something that wouldn't curl his hair when he took a draw on his pipe or cigarette. As the smoking habit spread tobacco culture was tried in various parts of the world, and eventually differing climates and soils produced tobaccos of various aromas and strength. The tobacco companies came along to blend these different tobaccos for the delight of the smoker.

The tobaccos grown in Turkey and other Mediterranean countries became prized for their rich aroma, pleasant taste and better burning qualities. Turkish or aromatic tobacco is used in all the popular brands of American cigarettes. We have been importing about 100 million pounds a year.

Today, world conditions being what they are, there is danger that we might be cut off from our Turkish tobacco supply. The American smoker would not like this, for aromatic tobacco is one of the two biggest things that ever happened to the cigarette. The other was the singing commercial.

But the cigarette smoker need have no fear that he will have to give up his tasty blends for we have learned that we can grow tobacco right here in America equal to the very best Turkish tobacco.

WHEN CURED, Turkish tobaccos are packed in 25 pound bales for marketing. The selling price may be $1.25 a pound.

Fine aromatic tobaccos, once imported from Turkey, now provide work for entire families in the South.

BY J. M. ELEAZER

The discovery that this high value crop can be grown in the Upper Piedmont section of Virginia and the Carolinas came at a good time for both the smoker and the farmer. Many of the small farms in the Piedmont support large families. The soil is often poor, and consequently their incomes low. Cotton has long been the mainstay of these farmers, but the boll weevil has put many of them on relief in recent years. And the Piedmont farmers are assured of practically no competition in the production of aromatic tobacco since its culture has already been tried in many other parts of the tobacco belt without success The Piedmont farmers are blessed with the proper land, climate, and large families to provide the essential labor. Consequently, there is a love affair blossoming between these farmers and the aromatic tobacco plant.

Encouraging to the farmers are the facts that we can use about 100 million pounds a year and they can get a dollar a pound and better for what they can put on the market.

There are good reasons why previous efforts have failed and the current one is succeeding. Other parts of the tobacco belt lack the proper climate and soil. In addition, knowledge and science were behind the latest plan. It was in 1928 that H. A. McGee, an employee of one of the large tobacco companies, completed his studies of tobacco production in many parts of the world and returned to this country. He knew tobacco well, and he knew what soil and climate are the determining factors in aroma, flavor and quality of the plant. The one section of this country which he felt might produce aromatic varieties was the near-mountainous sections of Virginia and the Carolinas.

At the same time McGee learned that Duke University, then just being built and endowed with a tobacco fortune had set aside a fund for research in tobacco problems. They thought McGee had a good idea, but they were already committed to a research problem on the domestic production of cigarette papers, which were (at the time) also imported.

McGee, who had taken a job as tobacco specialist with the South Carolina Extension Service, was not one to sit around and wait for a bigger and better cigarette paper to be built. He was eager to see his pet project get started so he sent to Turkey for a small package of aromatic tobacco seed. And in the spring of 1941, he made arrangements with county extension agents in three South Carolina counties to supervise small plantings of the newly imported aromatic tobacco.

When these farmers harvested the test plots of Turkish tobacco the crops were given to Duke University and a number of tobacco companies for testing. From these laboratories came encouraging reports. The home grown Turkish tobaccos looked good. Duke had now solved the cigarette paper dilemma and was ready to take on aromatic tobacco. Field men went among the cooperating farmers with advice and with price guarantees for whatever aromatic tobacco they might grow.

Since then there has also been a tobacco breeding program in motion. The geneticists took the imported tobaccos apart, gene by gene, to see what made them tasty, and what added the burning quality. They then bred toward these characteristics in developing their new plants. And now this work has progressed until we grow better Turkish tobaccos in some respects than those grown abroad. Up to 1950 all plantings were personally

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HARVEST TIME finds entire families picking aromatic tobacco. A few ripening leaves are carefully harvested each week.

BY HADLEY READ

FOR THE LAND'S SAKE

In Illinois, a soil test results in an exact fertilizer prescription for the land and a very close estimate of the increased yields it will bring.

MERLIN SHIKE laid his wrench down on the tractor drawbar and leaned back against the fender. He wiped his hands on his overalls and said, "Sure, I can tell you why I'm spending good money to have my soil tested and to buy fertilizer. That's easy." He grinned. "I just got tired of raising 40 bushels of corn on an acre that by rights should be producing 80 to 100 bushels."

Shike is a farmer who has a calculating machine on his desk and uses it. He has a pilot's license and flys on business trips, landing and taking off from a back pasture on his 176-acre farm in Warren County, in north-western Illinois. His approach to soil building matches his modern attitude in record keeping and travel. Before starting on any program that was to cost him money and effort, he secured a diagnosis of the condition of the farm. Only then did he spend several thousand dollars for limestone and fertilizer, shift his field arrangement, and change his crop rotation; for it was only after taking an inventory of his soil that he was convinced that such a program would pay off. The first step, the inventory taking, was to test the soil and find out what plant foods it had and what it needed.

Living in Illinois, it is not surprising that Shike was thinking about soil fertility or that he began by having his soil tested. Illinois does more soil testing than any other state in the union, and for years the scientists at the University of Illinois have been preaching their permanent soil fertility program with the zeal of evangelists. During the past seven years, farmer financed and owned county soil testing laboratories have been established in 80 counties and serve the farmers in nearly

A SOIL TEST DOES NO GOOD unless the recommendations are followed. Ed Walworth, County Advisor, studies the soil maps with Merlin Shike, pointing out the markings that tell where and how much fertilizer is needed. Samples of maps are shown on next page.

all of the 101 counties in the state. Last year they tested nearly 1½ million acres. The year before last it was almost a million. Since the first county laboratory was established in Whiteside County in 1944, nearly 4 million acres of Illinois farm land have been tested to determine the needs for limestone, phosphate and potash; soil tests for nitrogen that can be practically interpreted have not been devised. The central laboratory, operated by the University of Illinois College of Agriculture, has tested another half million acres.

Of course the farmers and the scientists of Illinois are not alone in their concern about the soil—the farmers and their advisers in every state are working on this problem. Illinois has, however, worked out a program that is worth the attention and study of the nation.

The Illinois System

The soils program, which has been called "The Illinois System of Permanent Soil Fertility," emphasizes five steps. They are:

1. Have your soil tested for its needs for lime, phosphate and potash. These tests should tell you whether these materials are needed, where they are needed, and how much is needed.
2. Apply limestone, phosphate and potash in the amounts called for by your soil tests.
3. Grow heavy crops of clover, alfalfa or other legumes and legume-grass combinations on each field regularly to supply nitrogen and organic matter and to help control erosion.
4. Save the fertility in manure, straw and cornstalks, and return them to

the land to supply organic matter and to conserve plant food.

5. Hold fertility on your sloping land by using such erosion control practices as adapted rotations, contour plowing, terraces and strip cropping if such practices are needed, and keep extremely rough land in hay and pasture.

In some farming sections there is need for a sixth step — adequate drainage. Where the conditions and slope of the land does not provide natural drainage, it should be provided artificially through tile systems or open ditches.

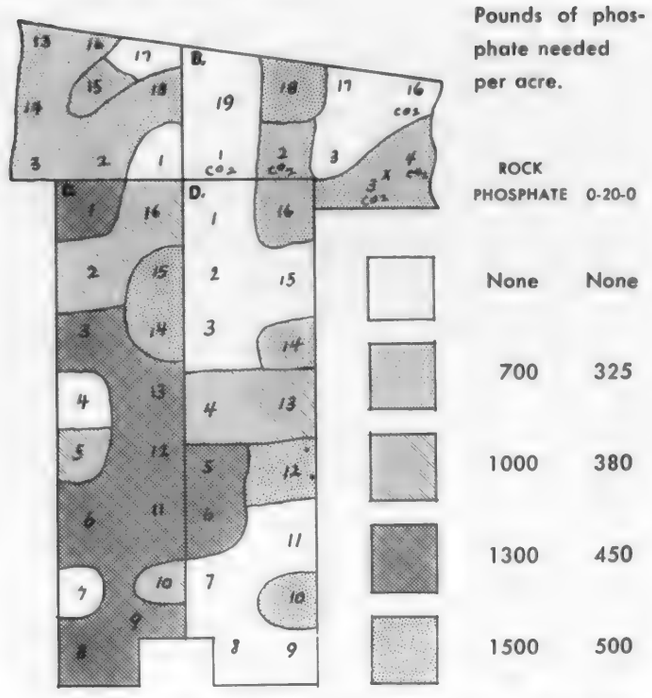
In essence the Illinois program is to build up the fertility of the whole top soil layer to the point where it can produce at least 100 bushels of corn to the acre, and to maintain this fertility. Lime is applied to the soil as needed to supply calcium and magnesium and potash and rock phosphate are used to supply these plant food elements, though returning crop residues to the soil helps: the bulk of the nitrogen is grown into the soil with the legume crop.

This program is not something cooked up by a high-collared scientist puttering around in a forgotten laboratory; it is a shirt-sleeve program developed by practical research men working directly with the farmer who has to pay the bill and put the program into effect.

"No one person can take credit for this system here in Illinois," Dr. W. L. Burlison, head of the University of Illinois Department of Agronomy, says. "Certainly the foundation for the program was laid down in the early years by Cyril G. Hopkins, who was urging farmers to turn 'stone into bread' at the beginning of the century. Those were the years when Hopkins literally stumped the state urging farmers to apply limestone and rock phosphate to their depleted soils and reap the reward of increased crop yields. Since Hopkins' time, we have emphasized and re-emphasized the need for feeding the soil and letting the soil feed the crop. That is the key to our entire fertility program."

This program has been checked and double checked by testing it on experimental fields and by studying the farm records of men who have been following it—men like young Merlin Shike who "got tired of raising 40 bushels of corn on land that should produce 100."

PHOSPHORUS MAP



SOIL MAPS TRANSLATE the results of the tests

Shike took over his farm in 1937, moving to it from poorer clay soil land.

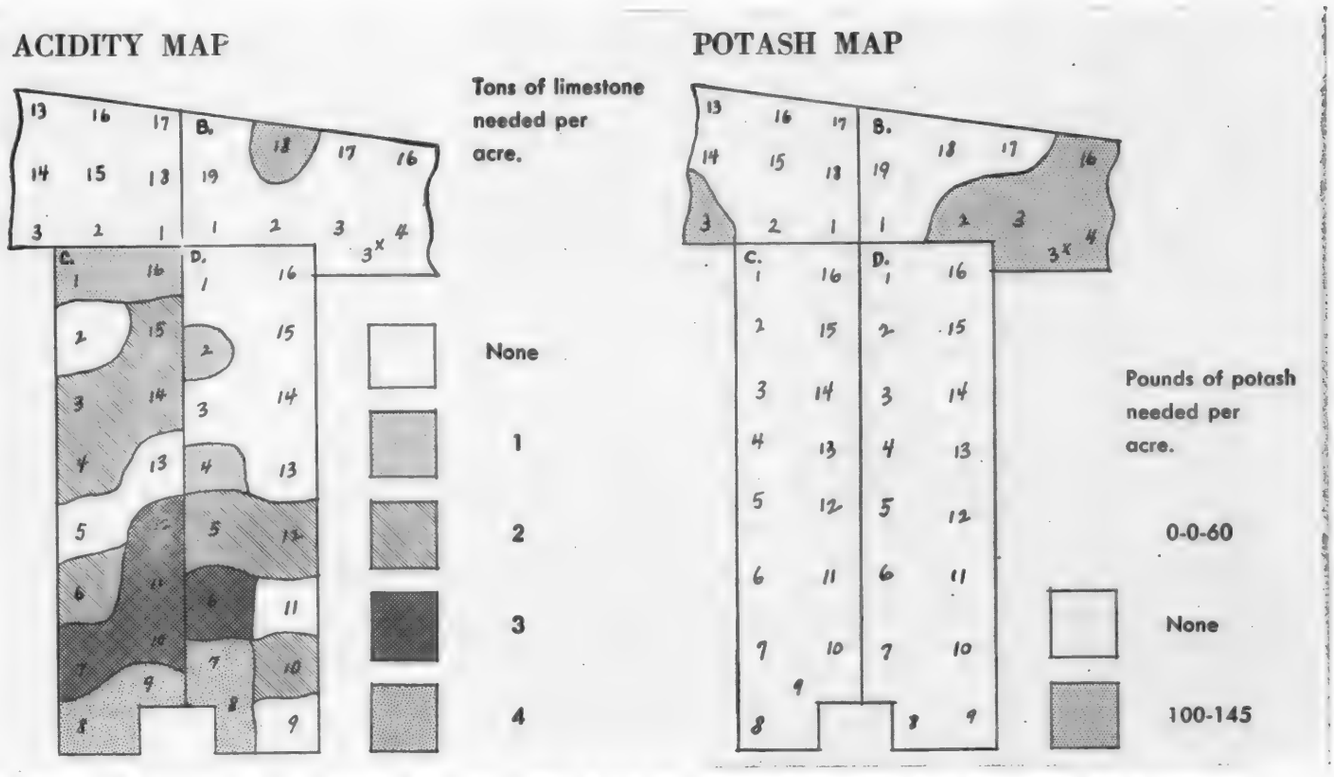
"That first year, I figured I would really bust every corn crib on the new farm," Shike says. "When I plowed, the soil turned over deep and black. The old saying that, 'it's hard to tell the depth of the well by the length of the handle on the pump' still stands—you just can't measure soil fertility by looking at it. The corn crop didn't make 40 bushels to the acre that first year."

The second year wasn't much better, and neither was the third. During the war years there wasn't too much Shike could do about changing things, but by 1946, when the county soil testing laboratory was established, Shike was ready for action. He couldn't get high crop yields, and he couldn't get good clover stands. He knew that the land had been farmed hard before he took over, but he hadn't known how hard. The farmers before him had made heavy demands on the fertility bank without making deposits. His account was overdrawn and now it was time to refinance.

Shike talked the problem over with his friend Ed Walworth, who is County Farm Advisor, the name given County Agents in Illinois. Walworth believes in soil improvement like he believes in motherhood and the Illinois football team. Before you could say "soil testing" Walworth *had* said it and was going on to explain the other parts of the Illinois program. Walworth pointed out that trying to start a soil improvement program without first testing the soil would be like having a doctor prescribe a dose of Old Doc Bledsoe's Snake Oil Cure-all without first seeing his patient or knowing his symptoms. Shike agreed that the first step was to have every acre of land on the farm tested.

The Warren county testing laboratory collected the samples, charging Shike 10 cents an acre for the job. He paid 35 cents a sample to have the technician run the tests for acidity, phosphate and potash. This price also covered the cost of preparing the reports. It takes some 11 samples to cover a 40 acre field, so the cost for the testing ran to $35.

For this investment, Shike received a



into amounts of fertilizer per acre needed on every part of the farm. Numbers show where each soil sample was taken.

sheaf of reports. These included maps, drawn from aerial photographs of the farm which showed where each soil sample was taken and showed the results of the test for acidity, for phosphate, and for lime. Also included were charts showing the acidity of each sample and the availability of phosphorus and potassium. Most important was a section interpreting all of the tests and making careful soil treatment recommendations for the farm.

The acidity tests showed that the entire farm needed liming at the rate of 3 tons an acre.

The tests for phosphate showed that all fields needed phosphate fertilizer, but in different amounts. For example, one field in the far corner of the farm had never been in pasture. It needed 1,400 pounds of rock phosphate or its equivalent in superphosphate an acre. One other field needed the same, but a field near the barn on which more manure had been spread needed only 1,000 pounds to the acre.

This is a good example of the value of soil tests. If Shike had just guessed at it and applied an average of 1,000 pounds of rock phosphate to his entire farm, all of his fields but one would have been short-changed and yields would have been lowered. On the other hand, if he had applied 1,500 pounds he would have been spending money that could be better used elsewhere. On a single 24 acre field that needed only 1,200 pounds, guessing high would have cost Shike more than $80. That is more than twice the cost of the soil tests for the whole farm.

On the tests for potash, Shike was more fortunate than many farmers; only three of his fields showed a low test for potash. The interpretation of the tests showed that applications of 150, 200, and 250 pounds of muriate of potash to the acre would correct the deficiency.

The testing procedure in the other county laboratories in Illinois follows closely the pattern of Shike's tests in Warren County. In some counties, farmers collect their own soil samples and bring them to the laboratory. In others, the laboratory man does the sampling. In all of them, the actual testing is done by a technician who has been trained under the direction of the central laboratory at the University of Illinois. This central laboratory also tests soil samples for farmers in counties where there are no county laboratories and makes regular check tests of the work being done by the counties. The state laboratory and nearly all of the county laboratories collect a fee which ranges from 30 to 60 cents per soil sample for performing the three tests and preparing the soil treatment recommendations.

Major Faults in Testing

A realization of the need for soil testing is growing, but most states are not pushing it as hard as Illinois. A survey by the Agricultural Limestone Institute of soil testing in all states shows only slightly more than one million soil samples tested in 1949. Nearly a third of this testing—more than 300,000 samples—was done in Illinois.

The major fault of soil testing is that some testers do not interpret the results of the tests for the farmers. Giving a farmer the results of a test without telling him what the results mean can do more

(Continued on page 131)

◀ LIMESTONE NEUTRALIZES ACID soil and provides calcium. The finer the grind the faster the limestone will act, but its value will be used up in a shorter time. ▶

MATCHING COLORS in the soils test is the key to interpreting the test in terms of fertilizer needs of the particular soil. ▶

A SOIL SAMPLE is secured from five probings with the auger in a rod-wide area. Samplings should be made throughout the field to cover all soil types present.

The blue tag is assurance of a clean seed adapted to the area for which it is certified.

BLUETAG SEED

BY GRANT CANNON

The Secretary of Agriculture
Dear Sir:

In behalf of a number of neighbors and friends, I hereby call upon your dept. to immediately investigate the facts concerning the seed oats that the Bumper Crop Seed Company has sold in this territory last fall. Their new oats, Bounteous, were highly recommended for this locality, criminally avoiding mention of the fact they were grown in Canada.

They sold many hundreds of bushel at $4.35 with irresponsible claims and reckless abandon.

The results this fall?

Dozens of fuming, disappointed farmers were hard hit by double loss in a good oat year: 3 to 5 times local prices for good seed; and a half crop or less and very poor quality from their seed.

We earnestly request you to come out to see for yourselves and also to take quick action now to stop loss to other farmers next year.

Thank you
Very sincerely,
RAYMOND VAUGHN

The names in the above letter have been changed, but the text is that of the irritated farmer who wrote to his state Secretary of Agriculture for action. The investigator who checked this complaint found that the seed oats were plump, fine looking oats, free from noxious weed seed. True, the variety was wholly unsuited for the region and the farmers had been bilked into paying an exorbitant price for them, but there is nothing in the law that says seed must be suitable or reasonably priced. The investigator reluctantly concluded that the farmers had been legally skinned and that there was nothing they could do about it. If the seed

ROGUING A FIELD, pulling out the rogues, the undesirable plants, is a necessary job where certified seed is produced.

A KEEN EYE is a necessary asset for the seed tester. Each weed seed or seed of another variety is counted; each fragment of chaff is weighed. Strict limits are set on the amount of this undesirable material that is permitted in certified seed.

had been *certified* seed of an approved variety produced in his own or in a neighboring state the story would have been quite different.

To be certified a seed must be of a variety that has been determined as being satisfactory for the state or for that area in the state for which it is certified. In addition to this the seed must be a pure strain of the approved variety, have a high rate of germination, and be clean and free of weed seed. The blue tag on the bag tells that it is certified and gives the information about variety, germination, and the like.

This desire to find reliable, clean seed goes back into the dim reaches of antiquity. In Biblical times Moses issued a commandment to the farmers, "Thou shalt not sow thy field with mingled seed." And St. Paul, writing to the Galatian farmers, played upon their agricultural knowledge to warn them, "Whatsoever a man soweth that shall he also reap." Mention is also made of sterile and unclean seed, and of sowing an enemy's grain with poisonous weed.

Since the Moravian monk, Johann Gregor Mendel, began cross breeding peas a hundred years ago, the work of plant breeders has increased the problem of keeping the varieties pure. If the seed of each different variety could be easily dis-

tinguished there wouldn't be much of a problem, but they aren't. Even the experts cannot tell the difference between such seed as Buffalo and Ranger Alfalfa, both of which are winter hardy and resistant to bacterial wilt, from other varieties; nor can they tell the difference between White Dutch clover seed which will cost them 95 cents a pound and the ladino seed that they will pay $2.00 for.

Crop Improvement Associations

Around 1910, various state groups were formed to try and work out the answers to the problems of producing pure seed. Shortly after the first world war ended, an international organization was formed for the purpose of coordinating the work of the various state groups in the United States and Canada. This directing body was named the International Crop Improvement Association. It has set up a set of standards for the state organizations to use as a pattern in regulating the production of clean seed. The state organizations, most of which are called Crop Improvement Associations, do the actual administration and carry out the work of inspection. Their rules for the production of certified seed are adapted to the conditions of the state from the International's rules, and are backed by laws of the state, which make it unlawful for any person to sell just any seed as being certified. To carry the certified label on his seed, the grower must have secured a certified seed of a pure strain of an approved variety to start with, and have submitted his growing fields and his harvested crop to rigorous inspection by the agents of the Crop Improvement Association to which he belongs.

A New Variety Is Introduced

Back in 1908, before the first Crop Improvement Association had been formed, Dr. Andrew Boss, Professor of Agronomy at the University of Minnesota, was concerned with one of the headaches of the plant breeder. "We spend ten to twelve years producing a new variety of wheat or oats or barley," Dr. Boss said, "and finally come up with a plant that is more disease resistant and yields better than anything we have ever had before. We painstakingly build up our supply of seed and finally release it to the farmers. In less time than it took us to develop the strain, the seed has become so badly mixed with other varieties that it is almost impossible to secure a pure sample." Professor Boss knew all this from sad experience, for the Haynes Bluestem and Glyndon wheats that he developed became so mixed with other varieties that it would have been as difficult to find a bushel of pure Glyndon as it would have been to find a registered Dodo bird.

Today the plant breeder can be sure that the varieties he creates will be maintained. In Iowa, for example, Dr. H. C. Murphy concluded a dozen years of cross breeding and testing with the release of a new variety of oats which he named Shelby. The first problem was to increase the small amount of seed that Dr. Murphy had grown, five bushels to be exact, so that there would be something to distribute. In Iowa, as in many states, an organization has been formed to handle this work—in Iowa it is called the Committee for Agricultural Development. The Committee took the five bushels of seed and increased it under their supervision until they had a good supply of pure seed of the new variety. By 1950 the Committee owned 28,000 bushels of the precious seed and were ready to issue it to farmers for commercial production. At this point the Committee was faced with the problem of placing the available seed into the hands of reliable farmers for increase as *certified seed*. Each county was asked to organize a seed distribution committee whose membership represented all active agriculture agencies in the county. These county committees were asked to make the initial recommendation.

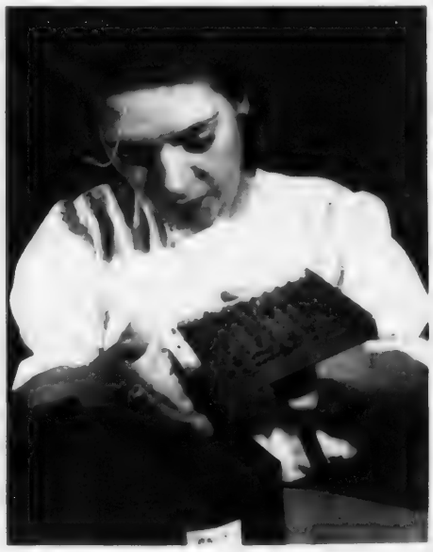
Questionnaires were sent out to interested farmers asking them such questions as: *Will you grow the crop under conditions qualifying for certifications? Will you be willing to spend as much as six man hours in cleaning the combine or separator before starting to harvest or thresh the Shelby variety (It will probably take longer)? Will you be willing to go through the field previous to harvest and remove other crops or other varieties?* The county committees made their selection of the farmers to be recommended from the answers to these questionnaires and from their personal knowledge of the men. The Committee for Agricultural Development eliminated some of the men recommended by the county committee and offered the new oats to others if they were willing to sign an agreement to produce the seed under conditions that would meet certification requirements and to sell all but 120 bushels to growers in the county according to the allocation made them by the county committee. The grower also agreed to sell the certified seed for not more than $1.00 a bushel above the November 1, 1950, price for cash oats in Chicago and, if his seed failed to meet certification standards, to sell uncertified seed for not more than 50 cents a bushel above this price. This last clause was introduced by shrewd farmer-members of the county committee who saw how easy it would be for a grower to deliberately fail to get his seed certified so that he wouldn't be bound by the certified price on the seed.

Raising Certified Seed

Ralph Morley, who owns 120 acres near Kamrar, Iowa, was one of the farmers who signed such an agreement and secured 36 bushels of Shelby oats for his foundation

GERMINATION TESTS show the seed's capacity to grow. These tests are conducted at the earth temperature at planting.

LIGHTWEIGHT SEEDS and chaff are blown up and trapped in the tube. The percentage of this refuse can then be measured



SEEDS ARE COUNTED quickly by drawing them into vacuum holes. In these tests exact amounts and weights are always used.

seed. From this point on his procedures were those of any other grower of certified seed. He paid the one dollar anual dues to the Iowa Crop Improvement Association and also deposited $20.50 with them to cover the certification fee, which is figured for oats at the rate of $9 for the first acre and 50 cents for each additional acre. This fee pays for the two standard inspections of the crop.

Since Morley was growing the first commercial crop of Shelby seed and had received his foundation seed from the Committee for Agricultural Development, he had no problem proving that the foundation seed was pure. If he had been planting as established crop he would have had to prove to the Crop Improvement Association that he was planting certified seed to produce his crop.

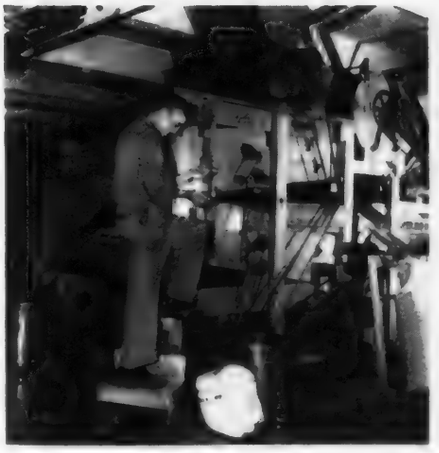
He planted the Shelby seed at the rate of one and a half bushels to the acre, more widely spaced than normal in order to make a larger seed crop, on land that had not been used for oats for four years.

In July, Morley received a card telling him that the inspector would visit his farm within the next three days. The following morning Morley was out in the fields with his two sons roguing the fields, cutting out weeds and volunteer corn. The fields were reasonably free of weeds and the three of them managed to rogue the entire crop by the end of the second day, which was just as well for the inspector, George Latimore arrived in mid-morning of the third day.

Latimore first checked the field to see that it was properly isolated from other oat fields—the rule is 10 feet if the grain was drilled in the neighboring field, 25 if it was broadcast—so that there was no danger of mixing crops. He then walked through the field and measured off several square-rod areas which he checked minutely for possible mixture of other varieties of oats, for smutted plants, and for other crops such as barley and spring wheat. He also canvassed the field carefully for primary noxious weeds. The field can contain no more than one plant of another variety or one smutted plant per square rod. Other crops whose seed cannot be separated from oats would be limited to one plant in five square rods.

Morley passed this first inspection. If he had failed in some particular that could be corrected, he would have been given an opportunity to make the correction and pay for re-inspection. Or he might have been able to correct the situation while the inspector was still there. If, for instance, there was not enough space between his field of Shelby oats and another field, he would be allowed to cut out a swath of the Shelby to widen the space to the proper width.

Morley and his oldest boy, Bill, found that the cleaning of a combine takes every minute of six hours and a little bit more. They worked through the mechanism from cutter bar to grain spout, using Mrs. Morley's new sweeper both as a vacuum cleaner and as a blower to clean out every seed from under slats, augers, sieves, and canvas feeders. The combining was carefully done, starting late in the morning after the dew had dried and keeping careful check on cylinder spacing to prevent damage to the seed. The harvested seed



A SEED CLEANING MACHINE must itself be kept meticulously clean. Its innards are vacuumed and flushed with a blower.

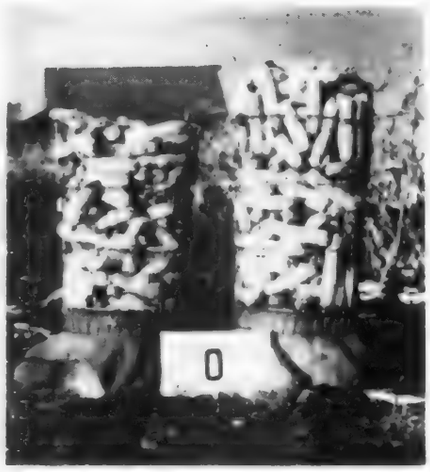
was stored in immaculately cleaned bins.

In the late fall, Latimore, the inspector, returned to the Morley farm to secure a sample of the cleaned seed for laboratory testing. This time his job was easy; he took a representative sample from the bin with his grain probe, sacked it in a clean sample bag, and sent it to the seed inspection laboratory of the Iowa Crop Improvement Association at Iowa State College at Ames.

Here the representative sample was itself divided into samples. One such sample was placed on a glass-topped light table and checked grain by grain for purity. Any weed or crop seeds or other material such as chaff are separated and weighed. Requirements for passing this test are that

(Continued on page 137)

CHECKING FOR MIXTURES of other varieties is a painstaking job that must be done on each field of certified seed to insure its purity. Adequate space between certified seed plots and other cropland helps to insure an uncontaminated field.



LEFT, two rows from a field planted solid; right, two rows from alternate planting.

EVERY ROW AN OUTSIDE ROW

Two rows of soybeans and two of corn, alternated, will yield 15 to 20 per cent more corn per acre.

Table 1. Alternate Planting of Corn and Soybeans, Babb Farm—1947

Planting method	Yield, bu. per acre	Difference, bu.
	bu.	bu.
Corn between corn	58	
Corn between beans	85	27
Corn between corn & fert.	76	
Corn between beans & fert.	89	13
Corn between beans & fert. Rows 30 inches apart	91	15
Corn between beans & fert. Population doubled in 40" rows	81	5
Soybeans between corn No fertilizer	26	
Soybeans between corn Fertilized	27	1

Fertilizer used was 200# 8-8-8 in row at planting time, and 200# of ammonium nitrate as a side dressing.

Table 2. Alternate Planting of Corn and Soybeans, Babb Farm—1948

Planting method	Yield, bu. per acre	Difference, bu.
	bu.	bu.
Corn between corn	88	
Corn between beans	103	15
Corn between beans Fert. and population doubled	128	No comparison
Soybeans between corn, no fert.	29	
Soybeans between corn 200 lb. of 8-8-8	32	3
Soybeans between corn 200 lb. of 8-8-8 400 lb. of $CaCN_2$	32	3
Soybeans between corn 200 lb. of 8-8-8 400 lb. of $(NH_4)_2SO_4$	33	2
Soybeans between corn 200 lb. of 3-12-12 400 lb. of $(NH_4)_2SO_4$	31	2

A FEW years ago a group of Indiana farmers cooked up a contest to find out how to grow 300 bushels of corn to the acre. It was tagged "Three Hundred Bushels or Bust." They all bust, for they found that when the yield got around 200 bushels the limiting factor became sunlight and areation. No matter how much fertilizer and manure was applied, how much the population was increased, or how plentiful the water supply, yields fell short of the goal because the inside rows simply got too little sunlight.

Everybody said, "If we could only make every row an outside row!" This was not a new idea either, but a practical way to go about making more rows outside rows hadn't been worked out. A. L. Lang, of the Illinois Agricultural College, decided to do something about it. Being a smart farmer as well as a crop expert, he took the problem to corn farmers around Urbana and tried out his theories. All the answers haven't yet been found but enough is known to give corn and soybean growers the green light.

It sums up to this: If you grow both corn and soybeans, plant the corn and soybeans in alternate strips and reap an average of 15 per cent more corn. If you have no soybeans—or no corn—you can enter the arena by adding the extra crop to your rotation.

The increased corn yield is apparently due to a lessening of the competition between plants for growth factors such as air movements, sunlight, penetration, moisture supply, soil nutrient availability, and others undetermined. There may also be advantages to the alternate growing of a legume crop with a non-legume crop; or to the alternate planting of a high and a low growing crop; or to the alternate planting of two crops having different nitrogen relationships; or to the alternate

AN EARLY SNOW catches an Illinois farmer with neither his beans nor his corn harvested. Both are standing and little harm done.

planting of crops which have rooting systems feeding in different layers of the soil.

Howard J. Babb, a farmer living six miles north of Champaign in Champaign County, Illinois, first tried out the method in 1947 on a two acre plot. A standard two-row tractor corn planter with fertilizer attachment was used for the planting. Corn was placed in the seedbox on the one side of the planter and soybeans were placed in the seedbox on the other side of the planter. The land was then planted back and forth across the field in the regular way, two rows of corn and two rows of beans in pairs, alternating. The same effect can be secured with a four-row planter by putting one kind of seed in the two center boxes and the other in the two outside boxes. Cultivation was carried out in the same manner as if the entire field had been in either corn or soybeans alone.

For the convenience of planting and cultivating, Babb spaced some of the rows the usual 40 inches; others, for checking, were spaced 30 inches. To make a comparison he planted a portion of the area solid to corn in the normal way without beans. The corn was drilled one kernel every 11 inches in the row, giving a population of approximately 14,000 plants per acre as measured in the individual rows. The beans were planted at the rate of 75 pounds an acre. Some of the pairs of corn rows were fertilized, others were not. In one pair of corn rows the population per row was doubled.

As the corn and beans grew Babb observed:

1. The starting effect of the fertilizer was more noticeable on the corn planted normally than where the beans were alternated with the corn.

2. The soybean plants apparently grew taller between corn than when planted solidly in the field.

3. Corn showed less tendency to fire at the base of the plants when alternated with beans than when planted solidly.

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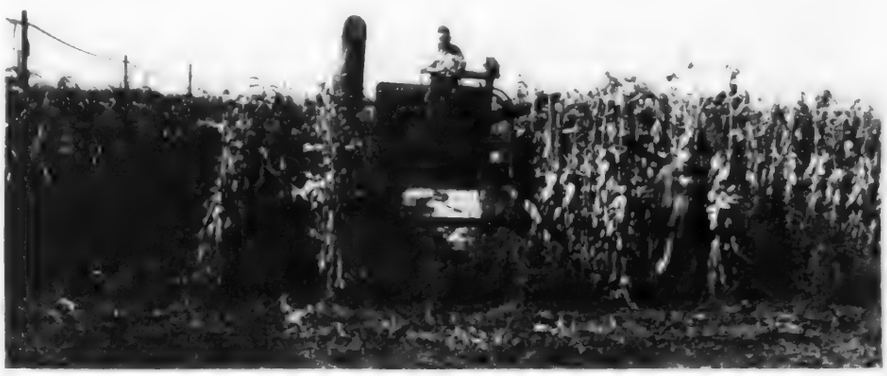

PLANTING AND CULTIVATING are done with standard planters and plows; beans are harvested with push-type combine.

SOIL SCIENTIST Roger H. Bray checks an Illinois soy bean crop for mineral deficiencies.

Tissue Testing

A quick, easy way has been developed to test growing plants in time to do something about it.

BY FRED KNOOP

A GOOD cook likes to dip a spoon into her soup as it simmers, so that she can taste it and see how it is coming along. Farmers have long done the same thing with their crops, with an appraising eye substituting for the spoon.

Unfortunately, the so-called "hunger signs" that a plant displays when it is not getting enough nitrogen, potash or some other mineral are really "starvation" signs indicating that permanent damage has already been done to the plant tissue, which is just another way of saying that there is going to be less yield, less profit (if any) per acre, when the crop is harvested.

Now, Roger H. Bray of the University of Illinois Agriculture College has developed an accurate tissue test kit, small enough so that it can be carried in a shirt pocket. At any time in the growing season, the small pieces of paper (about the size of a cigarette paper) can be put to use to read the amounts of nitrogen, phosphorus and potassium that crops such as corn or soybeans have in their stems or leaves. Discovering a shortage, long before the leaves discolor, gives the farmer a chance to do something about it in time to pull the yield up as much as 15 or more bushels an acre in the case of a nitrogen shortage in knee-high corn.

Tissue testing is not a substitute for soil testing. Farming with an accurate idea of whether crops are going to have enough of the right kinds of plant food for proper nourishment is just as reasonable as making certain that growing children have the right foods for their growth. In Illinois, complete soil testing laboratories have been set up in most of the counties, and farmers consider this so important that they have dug into their pockets to pay the bill for this work. This program is explained in detail in the article "For the Land's Sake" on page 50.

Tissue testing, unlike soil testing, is done after the crop is planted and under way. It is a check on past management and usually the findings are applied to future management. However, in the case of a nitrogen deficiency caught in the early or middle stages of growth, nitrogen can be side-dressed in time to make a considerable increase in yield. Crops short on potassium or phosphorus can be side-dressed and the fertilizer worked into the soil with a covering disk for truck gardens or other crops, where the value of the crop makes this worthwhile. If this is not practical it can be applied for next year's crop.

The first practical use of the tissue type test for nitrogen was made back in the '20s by Dr. F. M. Morgan of Connecticut and Dr. George Hoffer, who was then at Purdue. The first practical tissue test for phosphorus was developed by Bray in 1929. Like the potassium tissue test which he worked out in 1932, it had been originally used as a soil test. These early tests required choppers to mash the plant tissue, many solutions, test tubes and considerable formidable paraphernalia.

Bray later developed an easily used nitrate test, using a mixture of six different chemicals. This powder gives a wide range of colors from white through various pinks to a dark red indicating a lack, a sufficiency or an accumulated amount of nitrogen, in the plant. An indirect advantage of this powder is that it does not burn the hands or clothes of the tester and he can come back from his testing job with a whole pair of trousers.

In using the powder test, the method is to apply the powder directly to the portion of the plant tissue which has been sliced open with a knife, and inspect the color. This method is now generally used by experiment station workers, corn breeders and fertilizer salesmen.

Lately a new technique for potassium tissue testing has been worked out, using chemical color spots on a piece of absorbent paper. Dr. S. W. Melstead of the University of Illinois developed this test from the book known as "Feigl's Color Spot Tests." But again it was Dr. George Hoffer who carried the torch, and put this "spot" test to practical use in the field.

Early this year, Jim Bray, Roger Bray's son, assembled the three color spots of Dr. Melstead's potassium test, the phosphate test and the nitrate powder test that his father developed, into an ingenious "laboratory on a piece of paper."

All three tests are run on the same strip of paper; they are simple enough so that the most non-chemically minded dirt farmer can know how a crop is growing.

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ANOTHER METHOD of tissue testing for nitrogen is often used on corn or other large plants. The stem is cut and the nitrate powder is applied on a sap spot. If the powder remains white the plant is deficient in nitrogen. Red indicates the plant is receiving enough for good growth.

THE FINER THE BETTER is the rule of thumb in chopping grass for silage. As the silo is filled the chopped forage should be directed into place to help pack the fill and force air out.

With new developments, farmers need no longer throw away two tons of feed each time they open a silo.

HOW TO SAVE SILAGE

BYRON MEAD'S wife has a rule around their Indiana farm about how Byron shouldn't cuss. But there is one time each year when he feels justified in breaking the rule, and not being one who does things halfway, he hardly gets warmed up before his wife catches wind of what's coming from the top of the silo. At dinner time his wife doesn't say much until about half-way through the meal when she says softly, "Having yourself a little oratory out there on top of the silo this morning, weren't you Byron?"

Byron admits rather sheepishly that he was, and then tries to make excuses. "You work like the devil to get good silage in," he explains, "you work and sweat in the hot sun, then when you start feeding silage in the fall what do you do first? I'll tell you what you do. Even if you've covered it with weeds, you get up on top and throw down a couple of spreader loads of stuff that's only fit for fertilizer. That's enough to make a man cuss."

It isn't unusual for the average silo to have two tons of spoilage when opened. At a conservative value of $10 per ton this spoilage represents a $20 cash loss plus the cost of machinery and labor for getting the silage into and out of the silo.

In the 30 years that Mead has been making silage he has never grown accustomed to this waste of feed, feed that he feels could be turned into milk. As Mead's county agent has pointed out, up to 90 per cent by weight of his cows roughage can be silage. He thinks, and hundreds of farmers agree with him, that there should be a way to seal a silo and prevent spoilage. These farmers can take courage for farmers, manufacturers and scientists have lately come up with some good, sound methods of saving silage at the top of the silo.

At Mrs. Mead's suggestion Byron has been investigating the work of silage experts who are busy learning how to save more silage.

The popularity of silage has grown rapidly in recent times because it is almost impossible to make fine hay season after season. But, while hay is easily ruined, silage making is not complete insurance against feed loss. Silage can spoil too, and it often does.

In theory it is easy to stop silage from spoiling. Just keep out the air. In practice, however, this is not so simple.

Silage in contact with air spoils because the molds and bacteria which destroy silage live in oxygen. Where they can get oxygen and silage at the same time they consume the silage.

Hot silage is so common that farmers occasionally think that silage improves with heating. While heating may not ruin the feed, it never helps it. The farmer who thinks all silage should go through a heat is following the thinking of a husband who morning after morning nagged his wife because she couldn't make corn bread like mother used to make. One morning after many years the wife was feeling glum about burning the corn bread, until her husband smiled and said, "You've finally done it. That's like mother used to make."

Most spoiled silage is at the top of the silo. It is difficult to seal the top of a silo to exclude all air, but today we're finding ways to shut off most of it at the top, thereby smothering the bacteria and preserving the feed all the way to the top of the silo.

Inside spoilage is often the result of air leakage around doors or fluffy, strawy silage that holds air. A hole in a temporary silo may allow a streak of silage to spoil all the way to the top of the fill.

Take Your Choice

Every farmer who fills a silo regularly has his own method of sealing the top. Some work better than others, but over the years a farmer develops a loyalty to his pet plan and he isn't eager to change.

THIS GIANT bow-tie is the end of a silo cap tube being tied before the water hose is inserted. The tube holds 280 gallons.

The best way to get a maximum of good silage is to fill the silo properly. While this may seem obvious, it is still a point on which much success hinges. While the silo is being filled the chopped forage should be directed constantly into place and the top kept level. When the fill nears the top it should be tramped especially well around the wall of the silo. The right size and shape of pieces of the chopped plant make it easier to exclude air because the fill packs better.

After the silo is filled, tramping should continue twice a day until the silage settles no more and is firm beneath the feet. Walk around on the silage with a heavy foot the first four days after filling is completed. Then go back once a day until the silage will give no more against the walls and there is no longer a tendency for a crack to open along the walls. Excluding air from the top layer can save one to two tons of silage.

Some farmers go a step farther and cover the silage with some readily available material in an effort to seal out the air. Cliff Davis, for instance, who raises purebred Jerseys in Clermont County, Ohio, has been making grass silage for more than 15 years and after his silo is filled he sows oats on top of it. "First I wet it down," he says, "then I sow a peck of oats over it. The next step is to cover the new planting with some old straw or clippings from the yard and sometimes I wet that down. I always get a good stand of oats and I figure I lose only about half as much silage as I would without protecting the silage." Oats grow only a short time on top a silo, and offer the most protection while they are green.

A time motion engineer might be able to show Davis where he spends more in time and labor getting an oat crop on top of the silo than he saves in the value of the silage. The same might be true for a number of the silo sealing plans followed by farmers. Some farmers cover the silage with crushed limestone. It won't go through some blowers very well, so they usually haul it up in buckets. Other farmers cover their silos with waterproof paper and weight it down with slabs of concrete, which are also heavy to lift to the top of the silo. More common is the practice of covering the fresh chopped forage with a layer of weeds or leaves. This may and probably does save some silage, but it may not save enough to pay for the effort of finding and collecting the weeds. One man can spend the biggest part of half a day gathering swamp grass or weeds, hauling them to the top of the silo and tramping them in place. In Europe, and some parts of this country where trench silos are common, farmers cover their silage with earth, which adds weight. Such coverings fail to cut out all of the air.

In 1947 Dr. Charles F. Rogers, silage

FIRST STEP in installing the cover is to tramp the fill tight around the silo walls. Tramping forces air out.

ONE MAN can install a silo cap in less than one hour. Silage is first mounded in center and trenched around walls.

WITH CAP AND TUBE in place a water hose is inserted into the tube which, when filled, has enough weight to exclude air.

LIKE A HUGE DOUGHNUT a silo cap covers the grass silage in this temporary silo. With this device, and extreme care, a farmer can save all of the silage he puts in the silo. The plastic is weather resistant but can be punctured by an owl's claws. With a silo cap the silo can be filled a section at a time during the summer without important waste of forage.

researcher at the Ohio Agricultural Experiment Station, thought there should be a better way to seal a silo than these common practices. What was needed was a cap that would form an airtight union around the silo wall and move down like a piston as the silage settled. Rogers assures us that this was not the first time such an idea had been thought of. Previous inventors had tried to make a huge water bag big enough to cover the silo. The idea saved the silage up to the time the rubberized canvas bag rotted, which was only a few months after it was installed.

Rogers took his idea to The B. F. Goodrich Company, whose research men agreed that he had a good plan and went to work on it. Charles W. Leguillon and Victor H. Hasselquist of this company had already produced suitable materials for the cap. They gave the field studies close attention. Progress was rapid. After a couple of years of closely coordinated research between science and industry a new type silage cap was perfected. This device, which to date is the only one of its kind on the market, consists of two pieces of heavy plastic. One is a sheet that covers the top of the newly-filled silo. The other is a tube that goes around the edge of the sheet. When filled with water the tube fits against the wall of the silo to form an airtight seal. The tube for a 16 foot silo holds 280 gallons of water.

The silage cap is easily installed by one man in less than an hour if a water hose can be run to the top of the silo. Water could be hauled to the top in buckets but here the farmer is faced with the same objection found in covering the top with concrete slabs; the silage saved is seldom worth the labor spent.

The silage cap has proved its usefulness in saving silage in both farm tests and actual farm use. It can be used equally well on permanent or temporary silos. It is especially useful where silos are filled a

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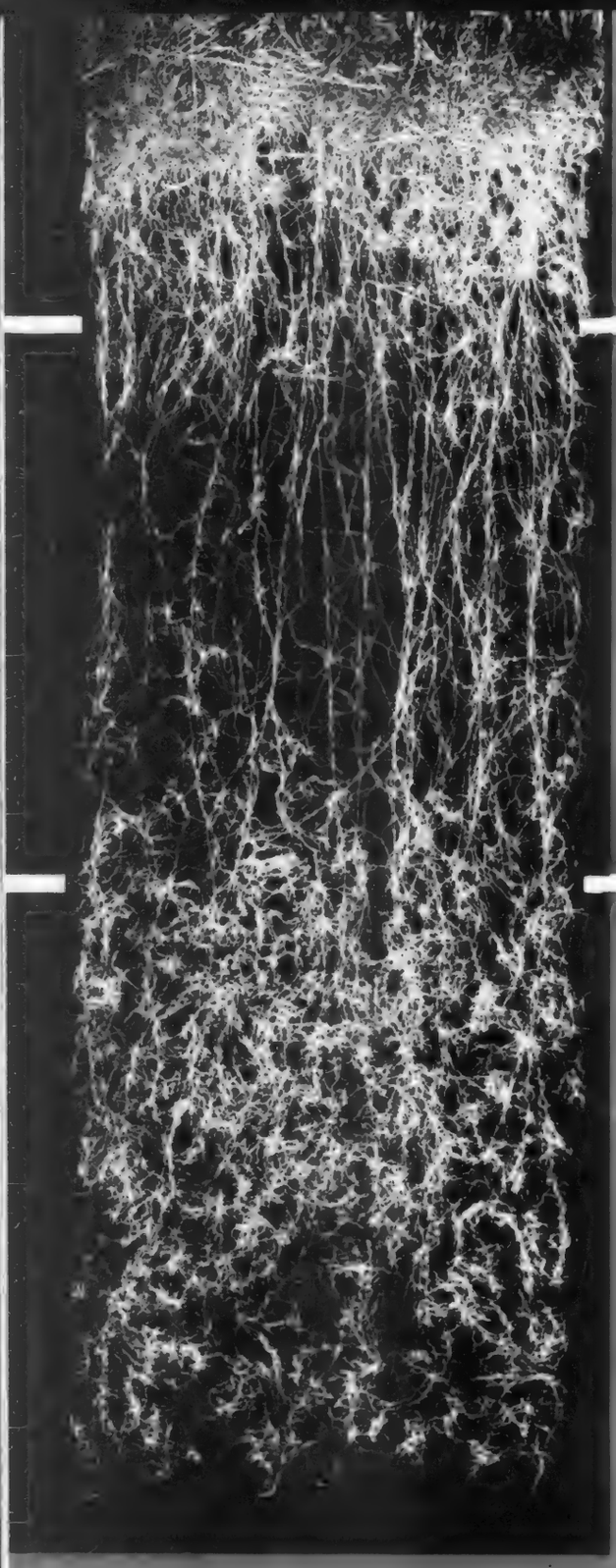

For a root, life is touch and grow. This Blue Gramma grass grew a healthy clump of roots in the shallow top soil, then sent exploratory roots through the next 11 inches of less fertile soil, and started serious growth again in the fertile sub-surface layer.

WHY ROOTS GROW

BY WILLIAM A. ALBRECHT

There is an old theory among farmers that sweet clover is a deep rooted plant, that alfalfa sends its roots into the subsoil regardless of what the subsoil holds in fertility, and that the grasses, timothy, bluegrass and the rest are only shallow rooted crops. These ideas are not entirely wrong; they are only half wrong.

Farmers have been told to plant deep rooted legumes to tap the soil for minerals and to enrich the deeper strata with organic matter. It's just not that simple.

Recent research in Missouri, Nebraska and Kansas has demonstrated that the so-called deep rooted crops can be either deep or shallow rooted and that shallow rooted crops can be deep rooted. They can be either, depending on the type of subsoil in which the roots grow. It is not the type of plant that determines the depth to which its roots go as much as it is the soil around those roots.

The grasses that we think of as shallow rooted crops do on occasion send their roots to great depths. Research men have taken their spades into the wheat lands of the Great Plains and dug up the root systems of wheat, which is one of the grasses. Wheat normally has shallow roots, but these diggers after fact went deeper and deeper in search of the root ends and eventually found that the wheat had sent roots down to 10 feet.

Professor J. E. Weaver also dug up the roots of some of the native paririe grasses and during his digging found a startling thing. The depth of the roots varied from one soil to the next for the same plant. On fertile deep soil the roots went deep, but on shallow soils with infertile subsoils, the roots stayed near the surface. Here again it was the soil and not the plant that determined the depth of its roots.

DEEP

Alfalfa can be shallow rooted and bluegrass deep rooted, depending on the soil

Bluegrass, the mainstay of Midwest pastures, was also checked below the surface. In a shallow soil its roots seldom went deeper than the top seven inches. In a deep soil, however, it penetrated to 20 inches.

What do these findings mean to the farmer? Briefly, they mean that planting a deep-rooted crop is not a sure fire method of increasing fertility on that piece of land. Rebuilding fertility calls for more than a deep-rooted crop, for where the soil is fertile to considerable depths most plants can be deep rooted ones.

It follows then that soil fertility must be enriched before a deep rooted crop can be expected to grow deep roots. Fertilizer, proper tillage, and all the other factors of good soil management must be combined with the proper crop to enrich the soil.

There is a theory among farmers the country over that the roots of crops are sent into the soil by the plant tops, much as a nail is driven by a hammer. Actually the tops of the plants have little to do with where the roots go. The roots work on their own and go where the soil fertility and moisture promise them nutrients for growth. Scientists have conducted experiments to show that roots with the tops cut off will still grow. The roots were placed in a jar of solution containing all the elements and compounds the roots needed to continue growth, and they continued to grow. Cuttings of these roots placed in fresh jars of solution and kept in the dark grew more roots. This was proof enough to the research men that roots grow in accordance with the water and nourishment they get, rather than the pressure they feel from the tops of the plants.

Many a home owner has had the same principle demonstrated in an expensive fashion every time the sewer gets plugged up by the roots of a tree. The root may have traveled 40 feet across the lawn and eight feet deep, and as he pays the sewer cleaner's bill the victim might reflect on the fact that this expensive trip by the root was not the root's idea at all. What happened was this. The root was not searching for water, for by the time it traveled 40 feet it would have gone so long between drinks that the tree would have died. All along that journey the root was getting some water, but it was getting little if any nourishment. Consequently the root was small, string like, and exploratory. It was doing more going than growing. When it finally reached the moist crack in the sewer pipe, and the plant nourishment that moisture carried, it really started to grow. Hundreds of tiny roots spread out inside the sewer where growing conditions were good, and the first thing the home owner knew about it was when his wife began nagging him to fix the sink. Where there was little nourishment the roots were not doing well, but when the table was set for their feeding they really took advantage of it.

At the same time myriads of other slender roots were exploring the earth in other directions. That is how roots of plants reach the fertile areas of the soil. Once in fertile soil they waste no time taking advantage of their find.

And the same holds true in a field crop. When the thin roots reach an area of fertilizer, rotting vegetation, or manure they spread out and grow in clumps. This makes the root system of a plant a good indicator of the fertility of the soil in

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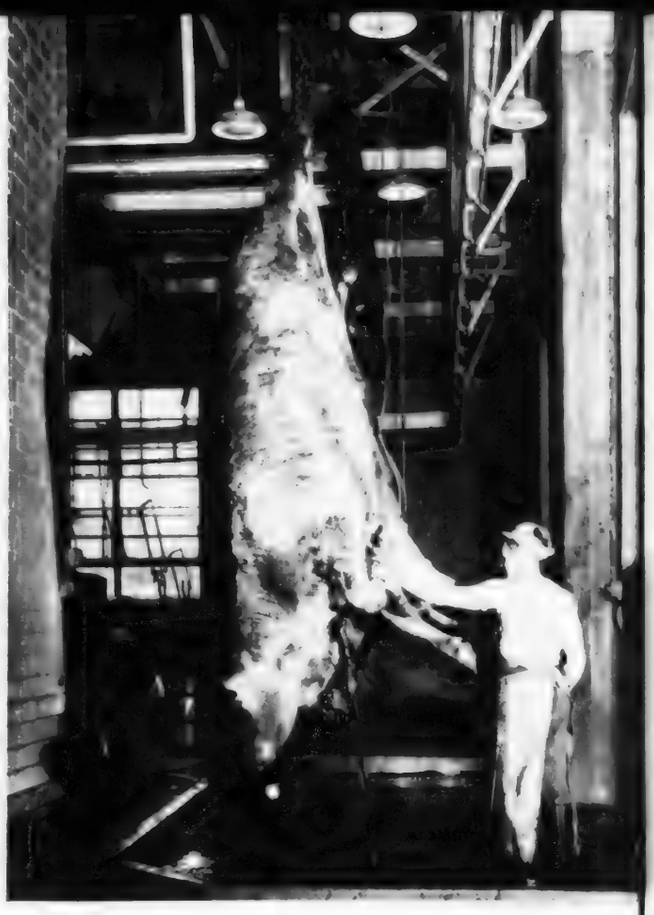
ABOVE: Plants will not waste effort on infertile soils. These three plants were carefully dug up to see how their roots had spread. The massive clumps of roots are all growing in pieces of buried manure. Between the manured spots the roots grew long and thin until they touched more fertile areas. BELOW: Here is proof that shallow rooted plants can grow deep roots. Both plants are Kentucky Bluegrass. The plant on the left slowed down after reaching the end of the seven inches of fertile top soil; the one on the right continued to grow because fertile soil was 20 inches deep.

WHO GRADES and PRICES BEEF?

BY JAMES E. McMAHON



The first step in setting a price on livestock is to grade the animals.

WHO sets the price of beef? And what will an individual animal bring? That depends on many factors, the grade of the animal, the number of cattle that were shipped in to the market, and beef on hand, and even the state of the nation. Perhaps the best way would be to follow a shipment of cattle from the farm and see them sold.

Loading cattle at four in the morning was a cold and thankless job; the animals dodged away from the loading chute as they would the doorway to doom—which, for them, indeed it was—and bawled and balked in the darkness. By the time he got them loaded on the truck and was ready to start the drive from his farm into the market, Charlie Cook, of Cedar County, Nebraska, did not feel like an important part of the economic machine. He felt like a riled man who had climbed out of bed earlier than usual and whose face burned because he had shaved with cold water.

Nevertheless, Cook and his cattle were forces at work on our economy. Before nightfall the cattle would be sold, thus affecting the available supply of meat; and Cook planned to shop around for some good stocker and feeder cattle, which would certainly affect the demand. Cook had a good idea what profit he would make on the animals. In the pocket of his denim jumper was a note book in which he had figured the cost of the animals and the amounts he had spent on feed and labor. He figured that his animals would grade a high good or choice and the market broadcast he had listened to said that choice steers brought $31 a hundred the day before and that demand for them was good. As a matter of fact, he found at the end of the day that he had guessed to within $10 of what he actually received for them, his estimate being on the low side, which is not surprising since he is inclined to be pessimistic.

Many farmers are sadly disappointed in the price their stock brings simply because they have failed to make an accurate estimate of their grade. Occasionally, of course, the market will drop sharply from one day to the next and even the most exact grading won't keep the shipper from feeling he's been hit in the head with a bull.

The advantage of a system of standard grades, which made it possible for Cook to figure his price so closely, was felt as early as the end of the last century, but it wasn't until 1916 that a carefully defined system of grades was put into effect. The introduction of uniform grades became essential when nationwide reporting of market news was started.

Widespread dissatisfaction by producers with market conditions and inadequate or inaccurate market reports was largely responsible for the start of this service which now helps Charlie Cook and other producers to carry on more intelligent livestock marketing. The reporting system, to make sense, required uniform grades by which livestock, produced and marketed in all parts of the country, could be compared.

Prior to 1916 there was little similarity in terms used to describe livestock at the various markets and in the various areas of the country. Even such terms as "heavy" and "light" did not have the same meaning at all times to all people, and certainly they had no meaning at all when it came to describing quality. Buyers and sellers were not consistent in their use of terms and often, as the character of the livestock changed with the seasons, the terms used to describe them changed too. At one time, cattle were even sold by measurement. So much was paid for an animal measuring a fixed number of feet around the belly and so much was added or subtracted for every inch over or under

this measurement. This was probably the only period in our history when bloat was considered an economic asset.

When the United States Department of Agriculture first began to plan a livestock market reporting service, its first job was to standardize the grades of livestock so that their reporting of market activity would make some sense. Fortunately, pioneer work had already been done at the Illinois Agricultural Experiment Station. This work, started in 1901, was used as a basis for establishing tentative government grades.

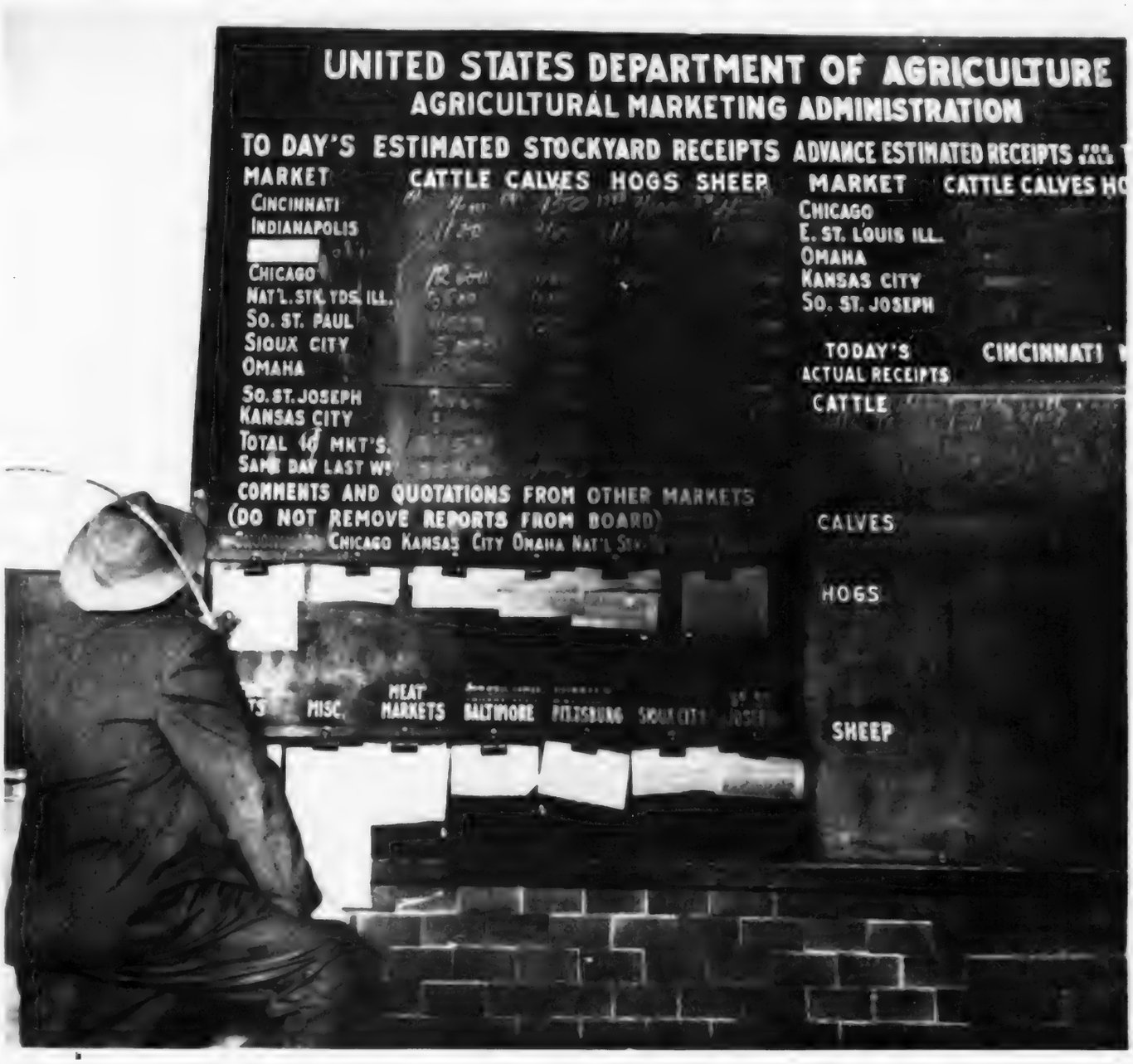
Grades and Reports

Using the Illinois research as a starting point, USDA livestock experts sat down with representatives of livestock exchanges, packing houses, trade journals, state universities, and farm groups to develop standards that could be applied uniformly throughout the nation. These men had to decide what was meant by such broad terms as "slaughter", "feeder", and "stocker" and they also had to define the hundreds of other terms that are used to describe these catagories. Out of their work and the continuing work that has been done on this problem came the present U. S. grades on cattle, sheep and hogs.

The establishing of grades and classes that have a uniform meaning throughout the nation has made it possible to produce understandable market reports. When the government market reporter roams through the stock yards at Ogden, or Baltimore or South St. Paul or East St. Louis examining the cattle and collecting the information on supply and demand and price, he can write his report in grade terms that will make sense in any part of the country.

The information that is collected at the 36 markets where price reporting offices are maintained is fed, hour by hour during the business day, into a nationwide teletype system that connects all of the market news offices. The information about other markets is posted on bulletin boards in each of the markets where these offices are located. Press association wires for both radio and newspaper consumption carry market information to every newspaper and radio station in the country. Market reports are also developed regionally and made available to many sources. Through his radio or newspaper, his farm magazine or trade publication, or by simply looking on the bulletin board at the stockyard when he arrived there,

MARKET REPORTS from the packing centers and shipping points of the nation are available at all of the larger markets. One of the results of the reporting system is to place the seller and the buyer on an equal footing.



Charlie Cook and thousands of other producers are given an idea as to what stock is bringing in their particular market and throughout the nation. With this information they are prepared to make an intelligent bargain for the sale or purchase of livestock.

Sorting Cattle

The men who set up the grading system went at it in much the same fashion their wives might have used to sort out the laundry—first separating the clothes as to use, dirty work clothes in one pile, dress-up clothes in another. The livestock men first separated cattle into three use groups, those that were ready for slaughter, those to be used as feeders, and those that farmers might buy to keep for longer than normal feeding periods, that is, stockers. These three groups can each be broken down into five classes that are based on the animal's sex or sex condition. They are: steers, heifers, cows, bulls, and stags. These classes can be sorted out according to the animal's age, such as vealers, calves, yearlings, two-year-olds and over, and they can also be grouped according to weights. Finally, when animals have been separated into use groups, sex, classes, age groups, and weights there is still a vast difference between the quality of the best and poorest and so they are graded according to quality.

There are seven quality grades that apply to slaughter steers and heifers: prime, choice, good, medium, common, cutter, and canner. All of these grades except prime are also applied to slaughter cows, bulls, and stags. Vealers and calves are graded from prime through common, but the poorer animals are grouped as culls rather than as cutters and canners. There are two variations in the grades for feeder and stocker cattle. Instead of prime, which is associated with a high degree of finish and therefore not applicable to an animal that is suitable for feeding or stocking, the top grade is fancy. Inferior is used to describe the lowest grade instead of the slaughter terms, cutter and canner.

Grading Cattle

Separating the animals into use categories, sex classes, and age and weight groups can all be done quite arbitrarily with the impersonal precision a grain grader uses in testing wheat for moisture. Sorting cattle into grades, however, is a different matter: here the grader is using his judgment of quality to place the animal in a grade. "We are just guessing, of course," a livestock buyer said, "but it is a trained, informed guess."

The factors that go into making a grade and which help the grader make an informed guess are conformation, finish, and quality. Conformation is the form or outline of the animal. It is important in grading because the shape of the animal influences the dressing out percentage, the relationship of the high and low priced cuts on the animal, and the percentage of lean, fat and bone. Finish has to do with the degree of fatness of the animal and the distribution of the fat. Finish, too, influences the dressing-out percentage and also the desirability of the meat. Quality is partly a matter of breeding and partly a matter of individual refinement and finish. In a slaughter animal the quality factor is its desirability as human food: in a feeder or stocker quality refers to the animal's ability to make economical gains and is indicated by breeding and type.

Each of the grades for each class of livestock has been carefully described by the USDA in the odd language of officialdom. An idea of the 32 descriptions that make up the grades for the five classes of cattle can be obtained from the descriptions of top and bottom grade for slaughter steers.

Prime—A prime grade slaughter steer very closely approaches the ideal in conformation, finish, and quality.

It is rectangular in build and very compact. The body is very broad and deep in proportion to its length. Top and under lines are straight and parallel, as are the lines of the sides when viewed from the front or rear or from above. The different parts are developed and balanced in a very superior manner, the proportion of loins, ribs, and rounds combined being very high.

The head is very short and broad. The neck is very short and thick, and the legs very short and set very wide apart. All parts are very thickly and evenly fleshed, each part having its proper proportionate thickness. The very thick fleshing causes each part to have a degree of fullness very much above the average, giving it a very plump, full, and well-rounded appearance.

The animal carries a very thick covering of fat. The thickness varies, being greatest over the back, brisket, twist, and rear flank and gradually diminishing over the sides and legs to the hock and knee joints. The fat covering is very smooth and evenly distributed, being free of ties, rolls, and bunches or excessive patches around the tail hed. Very large deposits of fat in the brisket, flanks twist, and cod cause these parts to be rounded out or distended to a degree very much above the average. This external fat is very firm.

The animal is very neat and trim in appearance. Bones are of medium size. The joints of the legs show no indications of coarseness. The flesh is very firm. The hide is loose, pliable, and of medium thickness. The hair has a very decided gloss or sheen.

Canner—A canner grade slaughter steer is extremely deficient in conformation, finish and quality.

In general build or shape it is extremely rangy or angular. The body is extremely narrow and shallow in proportion to its length. Top and under lines are extremely irregular and oblique as are the lines of the sides. Such a steer has an extremely low proportion of loins, ribs, and rounds combined.

The head is extremely long and narrow. The neck is extremely long, tapering, and thin, and legs are also extremely long in comparison to depth of body and are set extremely close together. The flesh covering is extremely thin and the lines of the different parts are depressed, sunken, or hollowed out to an extreme degree. The steer is extremely rough over the shoulders, crops, back, loins, hips, and rump and the bones of the shoulders and hips, the ribs, and the back-

THE KIND OF FEED these cattle get is important to the buyer. It may not show up in grading, but a buyer pays more for animals that he knows were well fed.

classification for slaughter cattle

CLASS	AGE GROUP	GRADES
Steers	Yearlings and 2-year olds	Prime Choice Good Medium Common Cutter Canner
Heifers	Yearlings and 2-year olds	Prime Choice Good Medium Common Cutter Canner
Cows	All Ages	Choice Good Medium Common Cutter Canner
Bulls	Yearlings and 2-year olds and older	Choice Good Medium Common Cutter Canner
Stags	All ages	Choice Good Medium Common Cutter Canner
Veal Calves	All ages	Prime Choice Good Medium Common Cutter Canner
Calves	(all classes)	Prime Choice Good Medium Common Cull

classification for feeder and stocker cattle

CLASS	AGE GROUP	GRADES
Steers	All ages	Fancy Choice Good Medium Common Inferior
Heifers	All ages	Fancy Choice Good Medium Common Inferior
Cows	All ages	Choice Good Medium Common Inferior
Bulls	All ages	Choice Good Medium Common Inferior
Stags	All ages	Choice Good Medium Common Inferior

THE GRADES OF LIVESTOCK are broken down into use, class, age, and grade groups. Can you grade the critters on the left?

bone are all extremely prominent.

There is no distinguishable fat covering. Even the ribs, loins, and rump are entirely lacking in such covering. There are no noticeable deposits of fat either in the brisket or rear flank, and the hide at these points usually hangs in folds and is, as a rule, extremely wrinkled.

The steer usually has an extremely unkempt and poorly cared for appearance. Bones are extremely large and the joints of the legs almost invariably are extremely rough. The flesh, as a rule, is either hard or extremely soft. The hide is extremely thick, inelastic, and tight. The hair usually appears extremely harsh and dry.

"Essentially, the buyer for a packing plant is buying beef not cattle." says Milton Schloss, President of The E. Kahn's Sons Co. "When I look at an animal I am trying to visualize how it will dress out, what the distribution of fat will be, what the color of the fat will be, in other words, the kind of carcass it will make. I check to see what sort of fill the animal has taken on because we aren't interested in buying water or half digested hay. By handling the ribs and looking at the brisket, which is the last place to take on fat, a buyer can check the fat distribution and estimate the proportion of fat to lean meat. Often I know the type of feeding the farmer has been doing and make price adjustments accordingly. I'm willing to pay a little extra for animals that have been fed well and discount animals I know have been fattened on silage or other less nourishing feeds."

The buyer for the packer is constantly checking his grading judgment against the carcass of the animals he bought, for as soon as they have been killed and dressed there is no more mystery as to what they should have graded on the hoof. The carcass can be and often is graded by a government hired grader who is the only person authorized to put the purple stamp on graded meat. Carcass grading is not compulsory, but it makes it possible for packers to buy and sell meat of a certain grade unseen and know what the carcass will be.

Steer, heifer, and cow beef is not designated by class in carcass grades, but veal, calf, bull, and stag are. By and large, prime, choice, and good carcass grades apply to beef produced from young cattle that have considerable finish. Below these three grades is the commercial grade which comes from maturer cattle which has considerable finish and younger cattle having a thin fat covering.

At the present time there is an effort being made to change the carcass grades. In essence the change would up-grade carcasses by one full grade. Prime and the present choice would be combined, the present good would be moved up to choice, and the younger cattle from the commercial grade would be moved to good. If this change in grading is put into effect, there will undoubtedly be a similar up-grading of the live animals.

Occasionally there is talk of selling animals on the basis of what their carcasses will grade after killing—such a system has been tried with hogs in one or two places—but this is not in the picture in the cattle market in the foreseeable future.

The Sale

Charlie Cook's steers were never officially graded because there is no such thing as an official grade being placed on live animals. He and the various buyers who looked over his steers graded the animals mentally in order to put a price on them. As always happens, the buyers seemed to fasten their eyes on the least likely of his steers, the one that would grade about medium where the rest graded a high good or choice, and argued price as though this steer were representative of the group. Cook, of course, pointed to the two steers that would clearly grade choice. The sale of any type of livestock seems to bring out all the old horse trading tactics. Sellers pretend that they never

A HARD CANNER is usually a milk cow that will end her productive days in hamburger.

A PRIME STEER need not be scrubbed daily, but they are fed as carefully as any baby. 4H club animals will usually grade prime or choice and bring a good market price.

really intended to sell the animals when they shipped them to market: buyers curb any tendency to be eager. Either may throw up his hands and walk out of the pen a time or two before a sale is concluded. "I'd rather drive them back to the farm than sell for that." "I'd go broke if I offered a penny more—I'm not going to get my money out of them as is." "I could get more for them by knocking them in the head and selling them to the rendering plant." But eventually Cook and a buyer came to terms and the cattle were sold. Cook acted as his own selling agent in this transaction. Probably a majority of the producers rely on trained representatives of livestock commission firms to sell their stock.

Neither Cook nor the buyer were at a disadvantage in this deal since the buyer had to compete against other buyers at the yards and Cook's cattle were competing with other cattle in their grade. Both men were informed on market conditions in their own market and throughout the nation. When it came right down to setting a price, neither Cook's nor the buyer's opinion would have varied more than a shade on quality grade, nor more than a dollar or two per hundred pounds. Before leaving his home, Cook had heard the radio market reporter from Sioux City announce that choice steers had sold for $31 the day before. Knowing that his steers wouldn't grade that high as a group he felt satisfied with the $30.25 that was offered him.

Market Report

The terms used by the market reporter to describe market conditions have been given specific meanings by the USDA just as have the grade names and market classes. When Cook heard the reporter say, "The supply yesterday was smaller with good demand and an active market." He was able to interpret this as meaning a strong market. Actually when the reporter used the word *smaller*, he meant that the supply of fed cattle on the Sioux City market had been less than the day before. The only other word used in market reports to indicate supply is *larger*.

Supply is but one of five categories that Cook hears or reads in the market reports. The others are:

Demand which is described as either *good* or *poor*. Good demand means that larger supplies are selling at unchanged to higher prices or that large increases in supplies are selling at unchanged to higher prices or that small decreases in supplies are selling at higher prices. *Poor demand* means that smaller supplies are selling at unchanged to lower prices or that large decreases in supplies are selling at unchanged to only slightly higher prices, or that small increases in supplies are selling at lower prices.

Activity: of the market is described as *active*, *moderate*, or *slow*, indicating the rate at which sales are being made.

Price trends and *price quotations* are described as *higher*, which means that they are above those of the day before; *strong* means that some sales were higher, but there was no advance on bulk of sales; *steady* means no change from the previous day; *weak* indicates that some sales were at lower prices, but there was no decline on most sales; and *lower* means, of course, that prices declined over the day before. When price changes are sufficient to be measured the change in actual amount is reported. *Uneven* is the word used to show that a larger than normal portion of sales is outside the quoted price range.

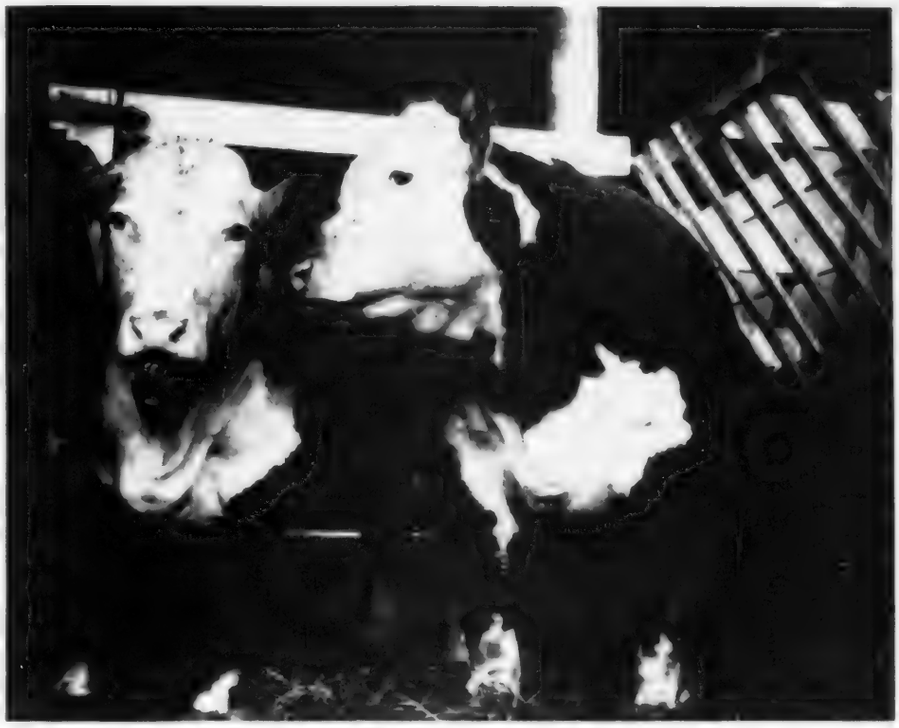
Clearance is described in two terms, *complete* or *incomplete* and is always given for a specific time. In this way the reporter can describe the extent to which the day's supply of livestock has been sold.

The market conditions that determine which of these terms are used may develop locally, but more often than not the change is caused by conditions in a market far removed. Charlie Cook's steers effected local supply when he offered them for sale, but they also became a factor in the national livestock supply and pricing structure. In this transaction, Cook had become a competitor in a highly competitive business.

Who Sets the Price of Beef

National supply of cattle and national demand for beef are the two factors that finally determine price. Sometimes, it is true, local supplies become too great for local demand and cause a price break that doesn't go beyond the particular market, or perhaps local supplies are short and the demand heavy, which might well cause a local price rise. In either case the local price will not remain out of line with national prices for long, for the national demand will absorb the excess beef, or meat will be shipped to an area in short supply and the national and local prices will be adjusted to each other.

This national demand for meat can be charted almost exactly on the line that shows consumer income. The demand for



CHOICE STEERS, raised commercially, are living baskets for marketing corn and pasture crops. Feeding animals to such a finish is often a boom or bust risk.

meat is tied to the consumers purse strings. if the purse is fat the demand is great and if it grows thin beef prices drop sharply. It is this factor that has given rise to the packer's phrase, "We don't really set the price of meat; the consumer does."

Since meat is a perishable product, it can't be kept in storage for long periods. Usually the amount in storage at any one time is just enough to keep all merchandising channels full. Because of this perishability, meat prices tend to seek the level that will keep supplies moving into the national market fast enough to keep up with consumption, but not high enough to start piling up.

Through the vast network of communication, word of price changes and supply shifts are soon carried from market to market. These many outlets are in closer communication than Charlie Cook is with his nearest neighbor. The hourly reporting of meat supplies on hand and cattle offerings on the market keep the price in the many markets in line with the national picture.

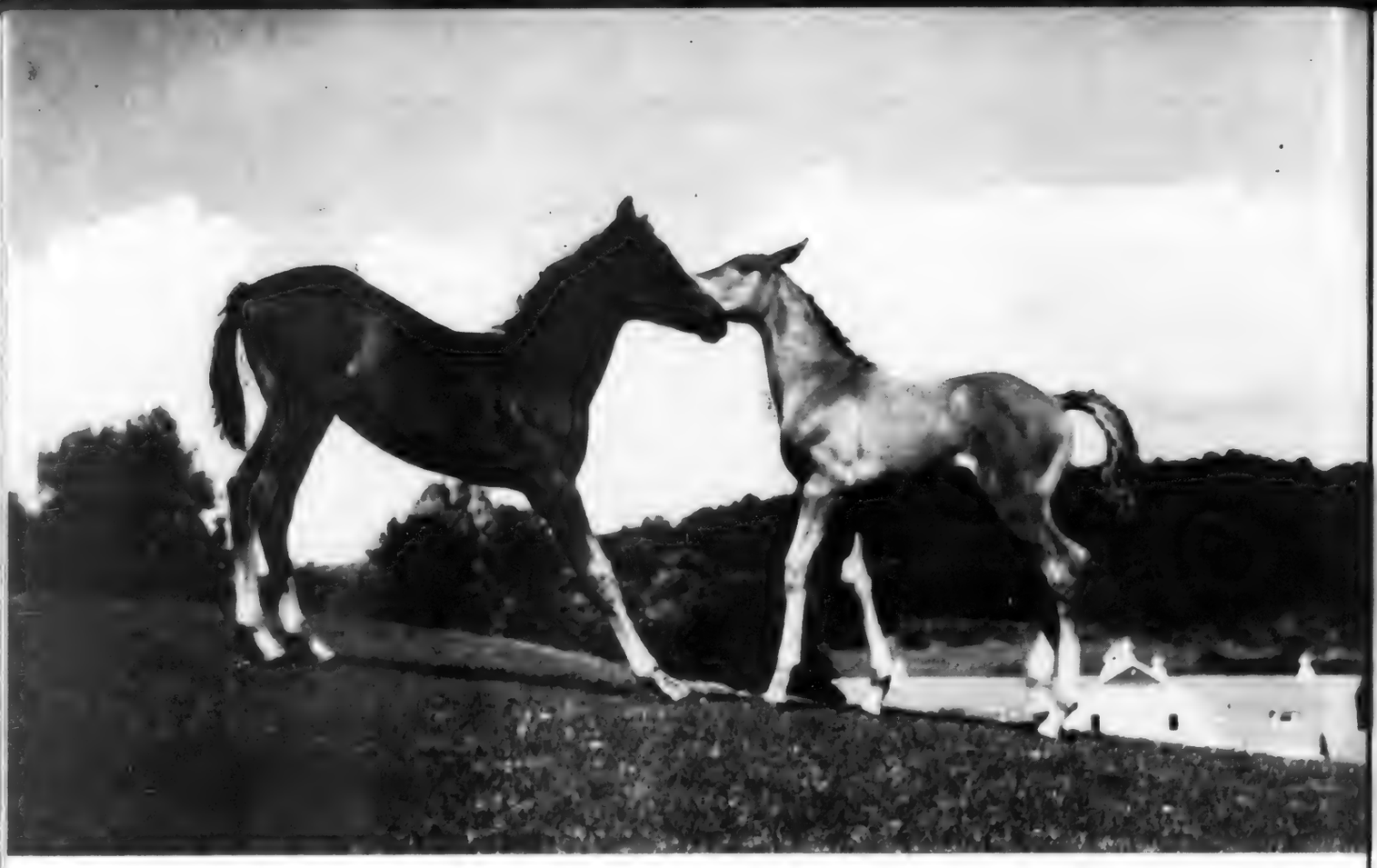
Whereas demand is affected by such things as employment, national income and the like, supply is most strongly affected by the seasons of the year. Cook and his fellow producers have to deal with the variation in quantity and type of feed available throughout the year. Grass is available in the late spring and summer and feed grains are plentiful after the summer and fall harvests. The feed situation has a profound affect on the make-up of livestock coming to market.

In the range areas, the ranchers ship their excess cattle to market as the grass begins to dry up in the fall. These cattle are suited either for slaughter or for stockers and feeders. As these grass fed animals hit the market in large numbers the price for them sags. In the spring, however, when producers are looking forward to a long period of grass feeding, the supply of these animals is down and the price up. This is the year by year pattern. It can be upset, however. A soft corn crop, for example, will bring competition for feeder cattle to consume the corn and prices will be high for this type stock in the fall instead of sagging.

Fed or finished cattle are marketed in substantial numbers the year around. The heaviest movement of them is from December through March and prices usually tend to be lower for a period after the first of the year.

The exact time any animals are sold depends, of course, on their state of finish, upon the feed situation, and upon the individual judgment of the farmer who owns them. In the case of Cook, the decision rested on the fact that he felt he had fed the steers as long as they would put on economical gain, and also on the fact that he was satisfied that he was hitting the market at a good time. He still had plenty of feed and intended to buy lighter, faster-growing animals to consume it. He knew that he might not be squeezing the last nickel from the market by selling when he did, but he also knew that he could sell now and take a nice profit on his feed and labor. And he believes that you can't go broke taking a profit. ★ ★ ★ ★

BARGAINING IS NOT ELIMINATED by the grading system. Only the area for maneuvering is narrowed. Agreeing on a grade is, itself, often a give and take proposition.



THE MORGAN HORSE

BY M. F. BAYLISS

Justin Morgan is to the Morgan breed what Adam is to man; all members of the breed must trace their ancestry to the founder.

JUSTIN MORGAN was the name of a man and of a horse who lived in western New England at the period of the Revolutionary War. The man, Justin Morgan, is remembered today only because of the horse that he owned. He supported himself and his family partly through school teaching and sometimes tavern keeping, but his chief interest in life was horses. Justin Morgan, the man, was one of a small group of Connecticut River Valley breeders who had the best stock to be obtained in America at that time. From the last of a series of good mares that he owned he bred the great colt whom he named Figure. This name did not stick with the animal, however, for he has gone down in history as *the horse* Justin Morgan.

Justin Morgan, the horse, was a bay colt, foaled in 1789. He lived to be 32 years old and founded a breed, the Morgan.

The colt's sire was True Briton, a bay horse from the De Lancey Stud of New York, at that time the best Thoroughbred stud in the world. His dam was a descendant of Wildair, the greatest stallion of his era. Through his dam, Justin Morgan was related to the gray charger owned by George Washington and shown in so many of the historical paintings of Washington. That gray charger came from the same part of the Connecticut Valley that produced Justin Morgan (both man and horse) and was bred by another member of the group that Justin Morgan, the man, belonged to.

The horse was named after the man and during the remainder of the man's life the two were as inseparable as a centaur. The horse proved that he could outwalk, outtrot, outrun, and outpull anything he was matched against in Vermont. His winnings helped support his master. A second source of revenue was the stud fees. For it was found that the horse was a prepotent sire who marked his get with his outstanding qualities. In this horse age of our history, before the building of the first railroad and before the advent of canal and water traffic, the services of such a stallion were in great demand. Before he died, this horse had made Vermont and New Hampshire the outstanding states in the breeding of light horses and had started the first American breed.

The Morgan blood was used in the establishment of the Standardbred, the American Saddlehorse and the Tennessee Walking Horse breeds and, for a time, these specialized breeds became so popular that there was danger that the true Morgan might become extinct. In 1870, Colonel Joseph Battell, of Middlebury, Vermont, began a lifelong project of breeding and studying the Morgan. Colonel Battell founded the American Morgan Horse Register and, in 1907, gave his farm to the government for the establishment of the United States Morgan Horse Farm. Here the breed has been perpetuated and, for the past ten years, has been made the subject of a study in the inheritance of speed and endurance.

The original Justin Morgan has been described as being 15 hands high and weighing 1000 pounds in his prime. His

body was round, short backed, close-ribbed, and deep. His legs were thin and wide-set; his head strong and sharply cut. His action was straight, bold and vigorous; and his style was nervous and proud.

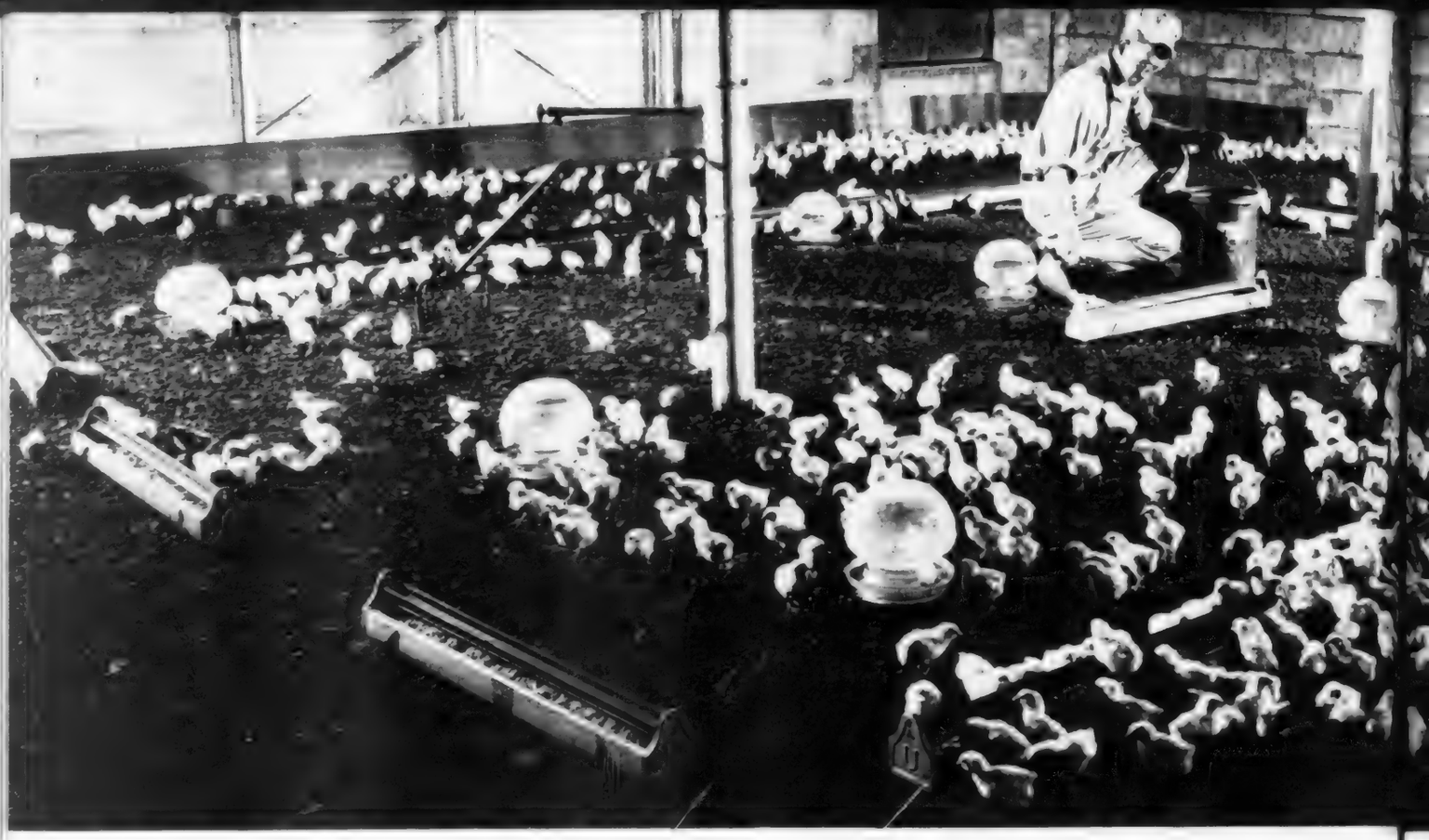
The breed today runs from 14 to 16 hands high, but the short-backed, proud build of Justin Morgan is still considered to be the ideal. In color the breed runs to solid dark without much white. There is a strain that comes in light chestnut, and these have more white in the markings and often have flaxen manes and tails, but the dominance of old Justin Morgan is seen in the number of blood bay horses with black manes and tails in the breed today. The versatility of the original Morgan is also a prized thing to the present breeders and there are special horse show events where the Morgan is shown under the saddle, in light harness, and in work harness dragging a heavily loaded stone boat. In 1948, Ulysses, one of the greatest modern Morgan stallions, won such a show on his 21st birthday. An ardent Morgan enthusiast, describing the event, said, "I watched Ulysses win that class, and I never saw anything more impressive. He loved it. His old head was up, ears pricking, his eyes shining. When it came to the stoneboat, he could hardly move it at first. It was so heavy half the draft horses in the United States couldn't have moved it, and would have stopped trying. Then he got it started. He threw himself into the collar and took it faster. Halfway down the ring, he got into a trot. He ended, literally parading with that load, joyfully flourishing it around at the end of the traces, and his driver had to run after him."

The Morgan horse on the farm today is used mainly as a riding horse or a stock pony, though many of them have their farm chores as well, pulling the cultivator or the hay rake or the snow plow. On some farms they are kept for their working ability alone. One boastful owner claims that he has to work his mules in relays to keep up with his Morgan stallion. The Morgan is definitely on the fiery side, but combined with his spirit is a nature that is so gentle that few stallions are gelded. Well treated, the Morgan is the perfect family horse.

The Morgan Horse Club was established in 1909 and has since performed the functions of a breed association. The American Morgan Horse Register is maintained by the Club in its offices at 90 Broad Street, New York City. The registering of horses, which averaged around 100 a year from 1920 to 1935, has spurted during the past ten years and now runs close to 700 a year. Though not large, as breed associations go, the Morgan breeders are intensely enthusiastic and extremely loyal to their gentle, spirited animals. There are even those among them who can look with equanimity on our dwindling gasoline supply and chuckle at the diminishing iron stores in the Mesabi range. Soon, they feel, America will come to its senses and go back to the horse. And we will be ready they feel, for the descendants of Justin Morgan can still drag a plow or a stone boat, pull a light carriage, or eat up the miles under a saddle.

PULLING A STONEBOAT is still one of the Morgan's chores. This breed works under the saddle and in light and heavy harness.

A STATUE OF JUSTIN MORGAN stands as a model of perfection for such direct descendants as Magellan and Mentor shown here. Like the first Morgan, these two chestnut stallions stand 15 hands tall and weigh close to 1000 pounds.



Heat From The Floor

BY RUDOLF SEIDEN

Floor heating, though expensive to install, eliminates the need for brooders, and cuts labor costs and waste space.

MAN has never designed a better heat-system for chicks than the keel of an old mother hen, but her limit was only a few more than a dozen. When the chicken industry outgrew the setting hen, some way of keeping the young chicks warm had to be devised. Every chicken raiser has his own pet substitute, commonly known as a brooder, for the blood heat of the hen: some home-made and simple, others complex and expensive.

All of them are some form of contraption to keep the chicks warm at an even temperature, with various ingenious tricks to keep them from piling up and smothering. The very best are not perfect. Whether the heat comes from oil, electricity, coal, wood, or gas, they have the failings of mechanical contrivances. The power goes off and the hatch is chilled; an oil stove overturns or blows up and the crop is roasted before it's time; wood, coal, and oil require time and labor for stoking. The problem of crowding has never been solved except at the cost of wasted space.

Anyone who could create a perfect substitute for the setting hen with the capacity our mass production of chicks demands would deserve a medal and a statue from the industry.

The newest thing, and a step toward perfection, is floor heating. Sometimes incorrectly called radiant heating, floor or panel heating, does away with the common brooder. Its principle is very simple: The heat of the warmed floor radiates throughout the room, keeping it uniformly and comfortably warm at even temperatures.

Types of floor heating generally fall under two groups: (1) Hot air, and (2) Hot water or steam. The type to use depends on the type of floor already in the house or the type desired if construction is new.

Hot Air

If you already have a single board floor in your brooder house with sufficient space beneath, you simply install a stove under the house and fire it up, using any fuel at hand. If there is not sufficient space for a stove, it may be practical to dig a pit or small cellar sufficiently large. Unless the stove sets under the center of the floor, it may be necessary to install a fan to get uniform circulation of hot air.

If the floor is made of concrete it may be possible to install a flue system of heating. Two or three flues, made of drain tile, are run the length of the building and joined at one end to the stove, the other to the stack. The joints should be closed with cement, and the temperature regulated by dampers in the flues. In all cases the space beneath the floor should be tightly enclosed and no outside air permitted to enter. This system requires a basement or stove pit lower than the floor so that the flues will have a pitch of not less than two feet per 50 feet of length. At the upper ends, where the flues join the stack, the flue can come within a few inches of the bottom of the floor.

A variation of the two types described above is the double floor system. A second floor of boards is built over the first (which may be either wood or concrete). This floor should be 1⅝ inches above the first. Two 5 ft. x 5 ft. air ducts are run the length of the room next to each other at the rear wall and on top of the upper floor. One is for warm air, the other for cool air return. Small openings are cut in

concrete. If the floor is wood, ¾ inch to 1 inch pipes are laid along the joists in contact with the floor boards. If the boiler is on the same level as the floor, a motor-driven pump will be needed to force the water through the pipes. If there is a basement or pit available which will permit the installation of a thermo-syphon system, no pump will be necessary, but the pipes will have to slope one inch to each 10 inches of length. The pipes should be from 9 to 15 inches apart, this distance depending on the size of the pipe and the speed with which the water circulates.

If there is already a cement floor in the house, grooves may be cut in the cement, the pipes laid in the grooves, and the grooves then filled up. If a new floor is to be put in, one-inch to 1¼-inch wrought iron or welded steel pipes or ¾-inch copper pipes, are laid over gravel or not less than 1¼ inches of concrete and then covered with 1½ inches of concrete. The copper pipes will be more expensive than iron or steel, but the installation costs are less and smaller pipes can be used because the water circulates better in copper pipes. The pipes should run parallel, 9 to 15 inches apart. It is advisable to lay the pipe in several separate sections so that if repairs have to be made only a part need be out of commission. Heat is furnished either from hot water or steam and circulation is achieved either by a pump or by the thermo-syphon method.

This type of heating (hot water or steam pipes embedded in concrete) is the most efficient and dependable, but also the most expensive to install. Steam systems are rarely used because of the cost.

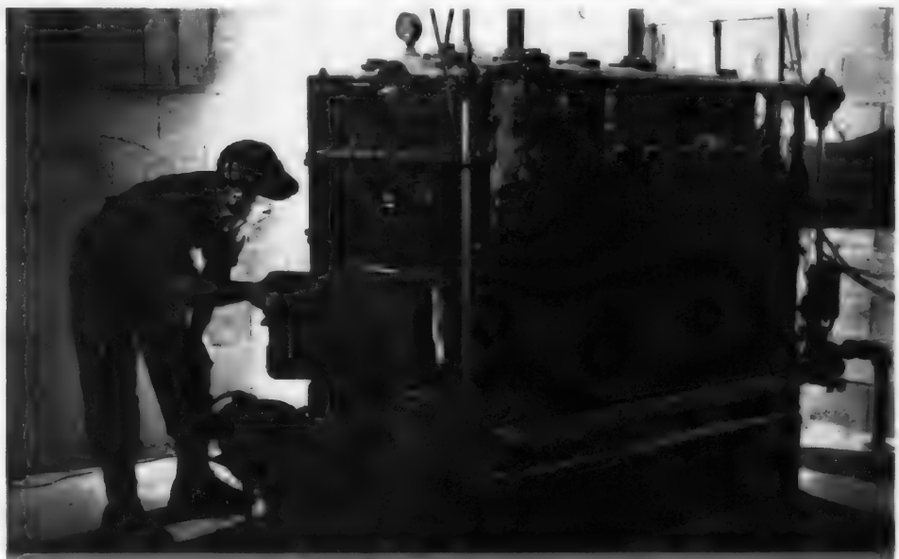
Ventilation, either by fan, windows, or space between rafters, is always necessary. Whatever the ventilation system, drafts must be avoided. Good insulation and double windows with an hermetically sealed air space between eliminate excessive heat losses. Sashes with glass substitutes which permit the ultraviolet rays of the sun to enter are preferable, but expensive. The more sun heat used the less the fuel cost.

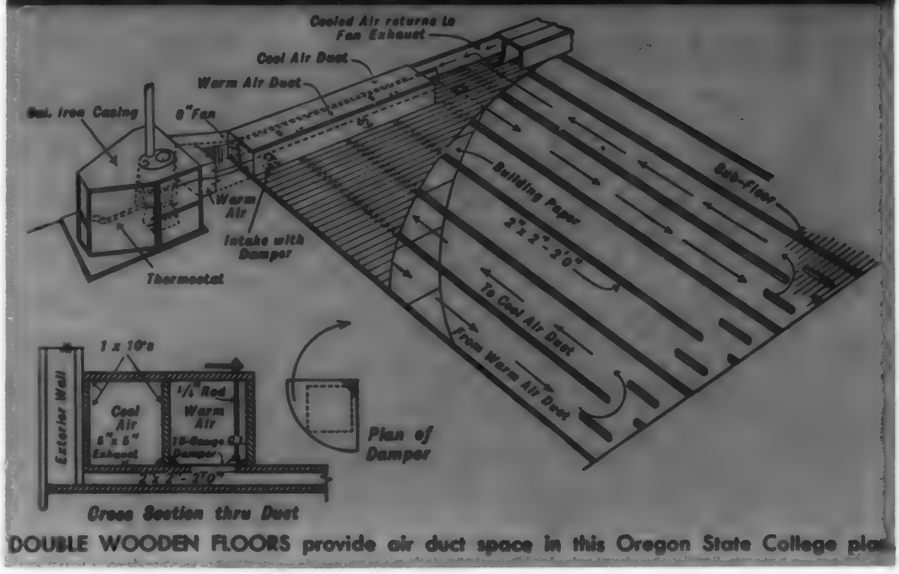
Advantages of Floor Heating

Floor heating eliminates the use of brooders and the time, labor, and incon-

(Continued on page 94)

AN OIL FURNACE heats the water and an electric pump moves it through the pipes.





DOUBLE WOODEN FLOORS provide air duct space in this Oregon State College plan

the bottoms of these ducts at regular intervals to permit the warm air to enter the space between the floors and the cooler air to return to the furnace. The space between the floors is divided into sections by means of boards laid perpendicular to the air ducts the width of the room. Each section consists of two channels, one for leading warm air from the duct to the opposite side of the room, and the other for the return of cooler air to the cold air duct. Each section is approximately one foot wide. There is no fire hazard—only warm air is in the space between the floors — and no smoke or fumes. An old coal burning brooder stove encased in a sheet metal jacket may be used.

A fan at the stove will increase the efficiency and permit closer regulation of temperatures. Dampers in the hot air ducts serve the same purpose.

Hot Water and Steam Systems

All hot water or steam systems involve a water jacket type of heater and a means of circulating hot water or steam through pipes. The floor may be either wood or

How to Break an OX

BILL HOLTON, who spends his time operating 322 acres of farm land, his own saw mill, and doing custom farm work for neighbors, thinks the pioneers had an ideal source of power in their ox teams. Bill appreciates fine oxen; he likes to work behind them, and he knows how to get the most from his beasts.

In addition to his three yoke of oxen he has two tractors, one of which is a track laying vehicle that he bought especially for logging around his saw mill. But this piece of heavy equipment takes second place in his affections to his hard-working cattle and consequently it seldom feels the weight of a log behind it. "I'd like to sell that tractor," Bill says. "I'd even be willing to sell it by the pound."

Holton, who at 48 still lives within a mile of his birthplace in Brown County, Ohio, not far from the Ohio river has known how oxen work and handle ever since he was hub high to a spring wagon. "My dad always had a yoke or two of oxen around the place," he recalls, "but oxen weren't as uncommon then as they are today. Why, in this part of the country there aren't enough farmers who own oxen any more to make up a good argument when they all get together."

It was about five years ago that Bill Holton went back to ox driving. He had been thinking about buying a yoke for several months for he had an idea they would be just the thing to drag timbers out of the valleys which he logs. "But the real reason I wanted them," he admits, "was just because I have a likin' for them." He took a trip down into Elliot County, Kentucky, and paid a farmer $500.00 for a pair of 14-year olds. A year later he sold them for $720.00 which was what they brought on the hamburger market. "This," says Holton, "is the advantage of buying good beefy types of work animals. A lot of people are always asking me if oxen are a special breed, and I have to tell them no. Any type of cattle can be trained to work, but of course

(Continued on page 96)

THE OX TEAM is becoming an agricultural rarity. But a few farmers still work cattle; they like the slow steady pace, the temperament, and the stamina of their animals. Bill Holton's three yoke (right) get a daily workout around his custom saw mill. The team on the left, and their New England owner, can complete a long day's work without tiring. But, although a scattering of farmers still prefer oxen, the working cattle's glory is in his past. His future is less in the field than in the hamburger.

A BEAUTIFUL FLOWER dies that a tulip might bloom in your garden. The flowers of all bulbs are cut from the stalk, since the bloom robs the bulb of vigor and size. The worker, using a small knife, cuts the stem with one hand and with the other feeds a continuous stream of petals into a basket. The flowers of some types of bulb plants, such as the hyacinth, are not cut, but are stripped from the stem. The petals are dumped into compost pits. The bulb growers of Holland use vast quantities of straw for mulching. The straw is shipped in from wheat growing areas and is so expensive it is sometimes used a second season.

THE DURABLE DUTCH

BY R. J. McGINNIS

The Dutch wrestle with the sea, raise 60 bushels of wheat to the acre, and make a comfortable living on farms no bigger than an American pasture field.

The Dutch have conquered the sea so what have they to fear from man. Five hundred years ago they drove the Spaniards, the conquerors of that day, out of the country; in 1940 they defied the military might of Hitler. In both cases they demonstrated the durability of their love for freedom and the invincibility of a stubborn people who know they are right.

When their seams began to burst from the pressure of over-population back in the Middle Ages, unlike most nations, the Dutch did not turn to conquest for breathing space; they began pushing back the sea for more acres.

They have learned much from their ancient foe, the sea. The Dutchman is compounded of ocean elements, and he has much of the sea's stubbornness and constancy. Physically, he builds his brawn and bone from the diverse elements of the sea, the depository of all the minerals. His soils, newly reclaimed from the ocean bed, are fortified with all the minerals which older and worn-out soils lack, those health and growth factors which other less fortunate farmers must dribble on their soils out of sacks.

The Dutch have been a decent nation. They have loved peace and practiced it; and when the first moves toward international peace were made back in 1899, The Hague was chosen as the site for the peace palace. As a nation they have never had a scandal; they have had an enlightened and well-loved monarch since William of Orange in the Sixteenth Century, and have paid their debts. Most Americans would say, "Were I not an American, I would be a Dutchman."

Holland is grateful for Marshall Plan dollars, but regard them only as a loan. It hurts the pride of a Dutchman to find himself in need and he is determined to operate under his own power as soon as possible. Long ago he learned that there is nothing quite as effective in getting along, both individually and as a nation, as hard work. The Dutch went to work even as the last beaten German soldier was crossing the frontier. As a result, they are out ahead of any West European nation in recovery.

The respectability of Holland is based on the substantial burghers of their towns and cities, the individual integrity of their men in government, and above all, on their farmers. It is the latter that gives the nation its tone, for Holland is essentially an agricultural nation and its virtues are the virtues of solid men of the soil.

Dutch economy too, has always been sound because it rests on the broad shoulders of its farmers. They do a good job of feeding 10,000,000 people on an area about one fourth the size of Pennsylvania. The chief exports are those from the land, cheese, bulbs, butter, bacon, eggs and seed potatoes. What the Dutch need from the outside in the form of food is bought from substantial trade balances, normally enough to afford the comforts and some luxuries for

THE SEED POTATOES of Holland are prized all over Europe. Two kinds are grown, a large white for stock and a small yellow for table use. Seven tons per acre is average.

THESE THATCHED COVERS for hay and grain are lowered on pegs as the stack diminishes. A modern version is made of steel roofing and operated by ropes and pulleys.

all their people. There are no slums to speak of in their teeming cities, no subsistence farmers in their rural districts. Their colonies, now an integral part of the Kingdom, are rich.

Since the Middle Ages the Dutch have been snatching farms from the sea. Sometimes the sea snatches them back. Numerous times during the last two or three centuries big winds and tides have torn out the dikes. Then the stubborn Dutch start their windmills, and the long, slow work of pumping out the sea and sweetening the soil begins anew. Sometimes wicked neighbors wreck the dikes. In World War II the Germans blew the Wieringermeer dike; and the Allies bombed the Walcheren Island dikes to dislodge the Germans and open the channel to Antwerp. Ordinarily a part of a crop can be raised the year after the sea water has been pumped out. In three or four years full crops are possible. Gypsum and the leaching of rains are the two

STRAW is a valued by-product of grain farming. It is returned to the soil as manure or as mulch for bulbs. This baler is taking straw directly from the separator.

most effective methods of counteracting the salt.

Holland is a nation of small farmers. Ninety per cent of the farmers are in holdings of fewer than 50 acres; fifty per cent of fewer than 10 acres. About one fourth of the land has been reclaimed from the sea and these soils are rich and productive. Dutch farmers all do well, for whether a man owns 10 acres or one of the rare large farms, he is the product of generations of farmers who discovered long ago that it takes as much science and as many brains to be a farmer as a lawyer or a doctor.

The Farmers

Take Gerardus Geerligs, a citizen of the province of North Holland, the owner of 230 acres; or Charles van Parijs, a bulb grower of Lisse, with 7½ acres and an income in five figures; or Wynand Meerveld, a small farmer of Utrecht who supports his family, a maid of all work, and two hands on 35 acres.

These three represent a variety of Dutch farming; each has a different operation, but each has in common a willingness to work hard, and each is an expert in his line. Long ago the inefficient and the slothful Dutch farmer went out of business. Those in business now are experts.

PART I

The Big Fellow

Mynheer Gerardus Geerligs is a large plump man whose ample body seems to be bursting his skin. He has roses in his cheeks which come, he says, from a steady diet of cheese and milk from the heavy-uddered Friesian cows. He has a son, Kees, who last year spent eight and a half

THE CANALS of Holland are the truck routes of the country and most heavy merchandise is moved by barge. Here is a creamery boat making the daily pickups.

THIS GRAND DAME of the Dutch landed aristocracy may have a coachman to drive her to church, but she wears wooden shoes on week days and milks the family cow.

A BARGE LOAD of spuds is poled into the Amsterdam market. This barge may have come from the far north, shunted through Holland's interlacing system of canals.

months on an American farm, a member of a group of 32 Dutch boys who came to the States under the Marshall Plan to learn American farming methods.

The Geerligs farm is near the village of Anna Paulowna in the province of North Holland. A few miles to the north is the great dike which crosses the Zuider Zee and connects the provinces of North Holland and Friesland. It was this dike which the retreating Germans blew up near the end of War II, flooding 50,000 acres of the Zuider Zee polders. A polder is an area reclaimed from the sea.

This province looks out over the sullen North Sea, but the Dutch by their energy have made here a pleasant land where neat farms snuggle side by side along the dikes and canals, and sleek cattle graze in the lush pastures, only a few years ago covered by eight feet of sea water.

Gerardus has 230 acres which have been in the family since the polder of Anna Paulowna was raised up out of the sea 104 years ago.

Back of the farming skill of the Geerligs family is more than a century of intimate association with the fields and soil on this farm. Of the 230 acres, every square inch is tillable, less, of course, the neat grill of canals and drainage ditches which also serve as fences. From this 230 acres, at a rough guess, he takes off in tonnage two and a half to three times what is taken off a good American farm of the same size. Gerardus, like all Dutch farmers, does not bet all his guilders on one horse. The total failure of any crop is almost unknown in Holland, but should one fail on the Geerligs' farm, it would scarcely make a dent in his annual income. The diversification of the average farm in this section is indicated by the acreage sown on this farm of 230 acres: 70 acres of winter wheat, 65 acres of seed potatoes, 33 acres of flax, (for linen), 16 acres of sugar beets, 1 acre of mangles, (cow beets), 5 acres of oats, 6 acres of cabbage, 6 acres of onions, 4 acres of tulips, one half acre each of narcissus and hyacinths, two and one half acres of iris, 4 acres of glads, one half acre of strawberries, small acreages in green peas, rape seed (for margarine), beans, caraway seed, a little Indian corn, and the remainder in pasture and hay in rotation.

His 70 acres of wheat in 1949 yielded 90 bushels to the acre. The 1950 crop made 85 bushels to the acre. The year 1949 was exceptional. In a poor year the yield may drop to 60. In 1950, 65 acres of potatoes made a little over seven tons per acre. These were seed potatoes and not the biggest yielders.

Gerardus employs 10 men the year 'round. Seasonally, especially during the potato and bulb harvest, he'll employ many more. His son, Kees, makes a full hand, but Gerardus himself spends his full time in management.

Last year he received a little better than two dollars per bushel for his wheat, and like that on wheat, the market on all his crops was about what the American

THE MASTER OF SNIDDELAAR, Wynand Meerveld, his family, and hired help. Sitting, left to right, Mrs. Meerveld, her mother, and Mr. Meerveld. Standing, left to right, the maid of all work, the veteran trainee, and the boy who is surplus labor on a neighboring farm.

farmer averaged during the same year. His total income grossed four or five times that of a good American farm of the same size. This includes of course the high priced specialties, seed potatoes, bulbs, strawberries, onions and flax.

The American farmer who visits a Dutch farm of this type vainly seeks the answer to the question, "How does Gerardus Geerligs and his neighbors raise 90 bushels of wheat to the acre and 30,000 kilos of potatoes per hectare?" Gerardus himself will tell you that his wheat is planted in rows nine inches apart and then it gets at least two cultivations. Manure, both green and animal, is applied four or five times as heavy as is customary in America. Fertilizer applications are not exceptionally heavy for the wheat crop itself, about the same at planting time as is used in America and 175 to 200 pounds of 20 per cent nitrogen top dressed in the spring. However, in the rotation a potato crop will receive up to 1200 pounds of high analysis fertilizer per acre. Much of this carries over to the following crops in the rotation.

The humus content of the soil is kept at 10 to 11 per cent, four or five times as much as is found on the most fertile American farms. Fertilizer applied on this type of soil is utilized at a maximum by the crop.

The Dutch who farm the polders literally control the weather as far as rainfall is concerned. Experience has taught them that the water table should be maintained about 60 inches below the surface. To raise this during times of drought, or to lower in times of heavy rain, is as easy as raising and lowering the dams in the drainage ditches and canals. The soil is well supplied with all the minerals necessary to plant growth, having lately come

MRS. MEERVELD'S kitchen opens into the cow stable. She has left her wooden shoes outside on the step, an old Dutch custom.

THIS IS NOT A SHOW PLACE, dressed up for the tourist, but a typical Dutch farm house and barns. Functionally perfect, the buildings lack individuality and are as alike as peas in a pod. The stables are under the house roof, the barns being used for storage only. There isn't a weed nor a misplaced blade of grass on the farm.

from under the sea. This balance of minerals, only recently receiving attention in America, is no doubt a big factor in the heavy crop yields of Holland. What Gerardus can't tell is the know-how accumulated by generations of scientific farmers. He would have no reluctance to passing on this information, but he doesn't know he has it.

How Gerardus And His Family Live

Like all his neighbors, Mynheer Geerligs lives in a brick house, neat, as clean as a pin, and as four square as the Dutch. He has two automobiles, one an American V 8. His wife cooks on an electric stove, as do most Dutch housewives. The rugs in his home are made in Persia, there are American magazines on his reading table, and he smokes Havana cigars. When he goes in his fields he wears a pair of wooden shoes. His taxes are high. In addition to a high income tax he pays a polder tax for the upkeep of canals and pumping stations. Last year this tax was 47 guilders per hectare, which translated into American money would be a little over $5.00 per acre. He belongs to a cooperative, which usually buys his seed potatoes and seed grain. His other crops may or may not be sold through the cooperative.

He pays his workers $1.50 a day for regular work and $2.50 to $4.00 during harvest. The regular work week is 48 hours. Social Security, vacations, sick pay and sick leave are more generous to the laborer than in America. He can buy as much food and shelter with his weekly wage as the highest paid American farm worker.

Part II
The Little Fellow

Gerardus is a big operator as farms go in Holland. More typical of the home-owned farm is the 32 acres belonging to Wynand Meerveld and his wife Maria ter Maaten. Meerveld calls his farm Sniddelaar. He cannot explain what this means nor why his grandfather selected the name. He has owned Sniddelaar since his parents died before the war; it has been in the family for 55 years.

Sniddelaar is a few miles east of Utrecht. This is not a polder. Back in the middle ages it was not far from the sea, but the sea now lies 50 miles to the west, with the rich polders between.

The Meerveld home is as like its neighbors as two peas. Red brick, substantial, with steeply sloping roof; it has a well-kept lawn flanked by a border of fruit trees and shrubs with screened gravel walks. Every pebble is in place, every tree and shrub neatly trimmed.

The stable is under the same roof. A door opens from the spotless kitchen, modern even to an electric cooking stove, directly into the cow stable. There is no central heating. Each room has a small coal or wood burning stove set into a fireplace niche. The furniture is such as one might find in the home of a well-to-do Midwest farmer. He owns a small English car and a one-horse shay in excellent condition.

Meerveld is a stocky man with square hands, square shoulders and square buttocks. He is capable of turning out a tremendous day's work. The division of labor works only one way on the Meerveld farm. The women make full hands in the fields, but Mynheer Meerveld admits that he has never dried dishes for his wife. There are no children. A maid of all work, who can build a hay rack as easily as she can whip up a cake, a boy from a neighboring farm, and a Dutch GI farm trainee are treated as members of the family.

(Continued on page 113)

THIS IS MYNHEER D. KASSE, whose small farm is under the dike of Walcheren Island, on the Channel. From his bedroom window, during the War, he saw the blowing of the dikes which flooded his fields in eight feet of water. He is dressed in his Sunday best, a cap and suit twenty years old, his one pair of leather shoes, prewar. The gold ornaments at his collar, like his character and his farming skill, are genuine.

EVERY ROW AN OUTSIDE ROW

(Continued from page 59)

4. At harvest time the corn plants were standing much better where they were alternated with beans.

The data for Babb's 1947 trials are given in Table 1. Increases favoring the alternate planting method ranged from 5 to 27 bushels an acre depending on variations in plant populations and fertilization. The yields were secured by harvesting 50 lineal foot areas from each row of the paired rows on two different productive levels and averaging the results.

In 1948 results on the Babb farm were very much like those secured in 1947. Results are given in Table 2. Without fertilization, alternate planting of corn with soybeans increased the corn yield 15 bushels an acre. Fertilizing had only slight affect on the yield of beans. Where fertilization and population were both doubled. Babb got 128 bushels per acre, 37 bushels more than he got in 1947 by the same method. However, in 1948 there was optimum rainfall; 1947 was very dry.

In comparing the yield of soybeans Babb found there was a slight drop in alternate strip planting. There was less than one bushel difference between the yields of soybeans which were alternated with corn and the soybeans which were planted solidly. The solidly planted plots of soybeans yielded the higher. The corn and soybeans were both planted on the same date.

While Babb was experimenting under typical Illinois farm conditions, tests were being made on three University farms by Mr. Lang. On one farm two different population tests were made, 14,000 to the acre, and 20,000 to the acre. The overall results (Table 3) under similar conditions bore out Mr. Babb's conclusions.

Several other comparisons were made besides those on yield. These showed additional advantages in using the alternate row systems. The ears of corn taken from the alternate plots were greater in length and larger in diameter than the ears from the plots planted solidly to corn. The stalks were larger in diameter and shorter in height on the alternate row plots, which would lead one to believe that lodging would be less on these plots. The moisture content of the corn on the alternate row plots was lower at harvest time than on the plots of continuous corn. This could be due to better air circulation and less competition.

While Farmer Babb and Crop Specialist Lang were checking their results against each other, farmers elsewhere were trying out the practice. Travis McAllister, of Adams County, Ill., in 1949 planted ten acres to alternate four rows of corn and four rows of beans. He compared yields from this field with another 10 acre field planted solidly to corn and another of 10 acres in soybeans, solid. The corn in the alternate planting yielded 90 bushels per acre, 20 bushels more than the field planted solid. The beans showed no difference in yield.

John Mullins, an Iowa corn farmer, gave his own twist to alternate planting. He alternated one row of soybeans and two rows of corn. He was delighted with the increase in corn yield, although he failed to say what the increase was. Neither did he say how he harvested his beans, although it may be assumed he waited until the corn was off.

Using still another version, Earl E. Bennett, of Huntington County, Ind., planted three rows of corn in the normal spacing of two rows and almost tripled his corn yield.

As the 1950 corn and bean crop season closes there are a few sure-fire recommendations that can be passed along to farmers: (1) Yields of corn can be increased from 15 to 20 per cent by alternate planting, (2) Alternate planting will reduce slightly, or have no affect on soybean yield, (3) Four rows of corn are the maximum for maximum gain, (4) Increased population will increase yields.

No. 3 is important. Both the outside rows, in a four row strip outyield the two inside rows, and the south row slightly tops the north row. If more than four rows are planted, the inside rows (excluding the second row on each side of the strip) will not do much better in yield than the aver-

Table 3. 1949 Results of Alternating Paired Rows of Corn and Soybeans

Location	Corn Solid	Corn (with beans)	Difference
	bu.	bu.	bu.
Corn — 14,000 plants an acre			
Urbana	109.9	121.1	11.2
Hartsburg	97.0	119.0	22.0
Joliet	70.4	93.1	22.7
Average	92.4	111.1	18.7
Corn — 20,000 plants an acre			
Urbana	105.3	153.7	48.4
Soybeans			
Urbana	36.4	31.2	—5.2
Hartsburg	27.4	22.6	—4.8
Joliet	20.1	17.4	—2.7
Average	28.0	23.7	—4.3

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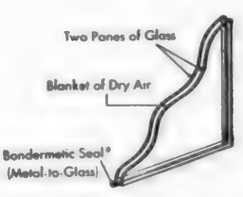

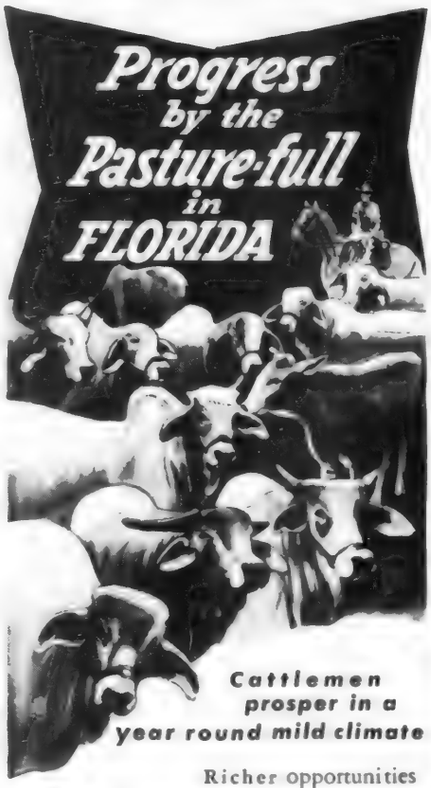

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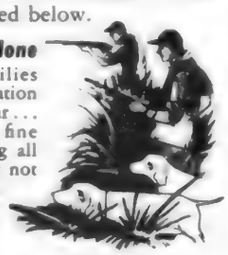

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age row on the solidly planted field.

The unanswered questions are: (1) How wide the corn rows? (2) How thick the corn population? (3) Which is better, to plant grains closer within the row, or space the rows closer? (4) How much fertilizer?

It is certain that yield can be increased by increasing the population, but how to do it and how much is a problem. From here it appears that 30 inch rows are better than 40 inch. It is certain also that if a farmer is to expect an increase in yield he must increase the fertilizer application, perhaps in the proportion to the expected increase. There must be sufficient plant food in the soil to support a bigger crop regardless of the mechanical method of planting.

Other angles of a changeover to alternate planting will occur to the smart farmer—those of time, machinery, and labor. There may be a slight disadvantage to planting the two crops simultaneously—time required to handle two seed packages and two fertilizer requirements.

Up to the point of planting there is no need for special machinery. Either a two-row or four-row planter can be used, as explained above. However, if you want to decrease the row width, and your planter has a non-adjustable axle, you may have to borrow, steal or buy a planter adjusted to plant less than the 40 inch row.

The population within the row is adjustable in all planters, old and new. A two or four-row push type combine is necessary for harvesting the beans, since they mature before the corn. If you haven't got this type, can't borrow, can't afford to hire or buy, then alternate planting of corn and soybeans is only of academic interest to you. Most cultivating machinery is adjustable.

While four rows of corn are the maximum number of rows for best results, the size of the bean strips may be as large as desired. For example, if your rotation now calls for twenty acres of corn and thirty acres of beans, a simple mathematical computation will indicate how wide the bean strips are to be. There is very little difference in corn yield between the two and four row plantings.

Driving through the corn states this past summer, one sees that alternate planting is catching on. The 1950 season, when its yields can be summed up and compared, should answer a few more of the doubtful points about the practice.

★ ★ ★ ★

STATEMENT OF THE OWNERSHIP, MANAGEMENT, ETC. OF THE FARM QUARTERLY

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(Signed) Wilbert Rosenthal, Publisher.
(Signed) Clifford Laemmle, Notary Public. My commission expires October 5, 1951.

ICE FISHING

(Continued from page 31)

and the cold doesn't seem to bother them.

Most fishermen drive their cars on the ice and use them as refuges when they get too cold. Minnesota law forbids fishing from an automobile: it's legal in Michigan, but not practical. Experienced fishermen tie the doors of their cars open. Enterprising garage men near the popular spots do a lucrative business fishing cars out of the lake for $100 per car.

In Minnesota the crappie is much sought after. In Michigan the perch is the favorite winter fish. There is some commercial ice fishing in Michigan where they catch pickerel and carp, which are shipped alive to Detroit and New York. One of the popular ice fishing spots in Michigan is near Tawas, where the city fathers offer free shanties, free heat, rod, bait, and an instructor. A shanty town built on the ice is known as Perchville.

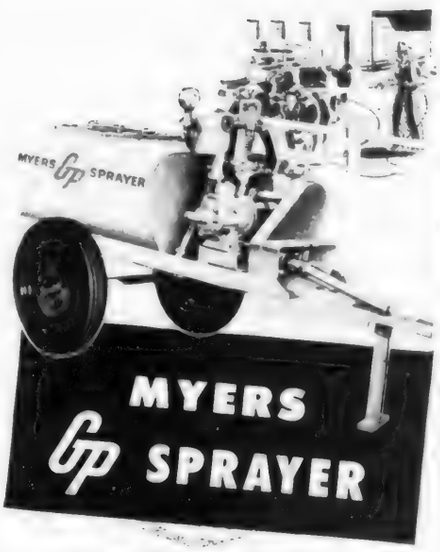
The fisherman on the cover is Jerome Larh who has an 80 acre farm near Lake Waconia, Waconia, Minnesota. He admits that ice fishing is not much fun, considering the cold and everything, and he says also that his family is never in need of food. Why he goes ice fishing he cannot explain. "Maybe it's just that I like to fish," he says.

TISSUE TESTING

(Continued from page 61)

In three minutes a plant can be tested, and a half hour of testing by running tests over several parts of the plot should give a pretty good picture of how a field of corn is doing.

The kit consists of 100 strips of paper, each of which has the three potassium spots already in place on it, a dropper bottle of test solution which has a collar of tin that is used for the phosphorus test. There is a small vial of powder used for the nitrogen test. The only additional equipment needed is a pair of pliers, which can be easily lifted from the tractor tool box. These are used to squeeze the juice out of less succulent plants.



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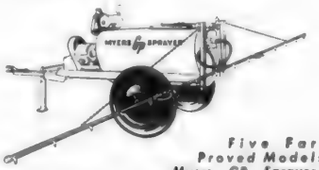
Throughout growing seasons a Myers GP Sprayer provides low-cost profit protection—fast, thorough dormant-to-harvest spraying for all kinds of crops. And there's sudden death for all livestock pests in its double-geared Bulldozer Pump—driving power to reach deepest imbedded grubs. Also permits easier, cheaper handling of scores of "between season" chores. Adjustable pressures of 30 to 400 lbs. for wide range of jobs — such as weed control, whitewashing, disinfecting, fire protection. Resistant-welded steel tank is non-absorbent, quickly filled and cleaned. Many other special advantages for all-season spraying efficiency. Mail coupon for free books.



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Here's how the test is carried out: A stem, leaf or any juicy part of the plant can be used, but the actively growing portions of the plant are the best to use for the test. They contain more sap and are better indicators of deficiencies. The time of day for testing does not matter much except for the nitrogen test. When a soil is supplying only *just* enough, not much nitrate accumulates. All of this is used up over-night so that in the morning the plant may test deficient, while later in the day it will test pink. So don't be an early riser for tissue testing. Wait until after 9:00 or 10:00 o'clock in the morning.

A juicy spot of the plant is applied to the three orange laboratory-prepared chemical spots on the test strip in the test for potassium (K). If a stem is used, it may be necessary to squeeze it with a pair of pliers. Each of the orange spots should have some of the plant juice on them. Then two more wet sap spots are made on the blank end of the test paper strip. These will be used for phosphorus and nitrogen tests.

The nitrogen (N) test is made first, on one of the clear sap spots with the small tube of nitrate powder which is contained in the kit. A small amount of the white powder (about the size of two or three pinheads) is put on the wet sap spot; the paper is folded and the powder is pressed into the spot for about 10 seconds. If the powder remains white, the plant is deficient in nitrogen. If it turns a light pink, a bare minimum amount of nitrogen is present. If the powder turns a dark red, the plant has accumulated an extra amount of nitrogen for future growth.

The next test is phosphorus (P), and the other clear sap spots are used for this. A small amount of the developer from the dropper bottle is applied to it and immediately it is placed against the bright end of the piece of tin rod which forms a collar around the developer bottle. If phosphorus is present in a sufficient quantity, the spot will turn a dark blue. Medium and lighter blues show phosphorus deficiencies. No color at all indicates the plant is very deficient.

Then you are ready to test for potassium by applying the tip of the dropper bottle containing developer solution to the orange spots, wetting them sufficiently to cover the sap. If the plant is getting enough potassium, the spots will remain an orange color after the developer is added. If potassium is low, some of the spots will turn a lemon yellow or become colorless.

The first spot on the strip is the most sensitive and it stays orange if only 1000 parts per million (ppm) of potassium are present. The next spot is sensitive only to 2000 or more. The third spot in the middle of the strip requires 3000 or more parts per million of potassium to keep it from turning a pale lemon yellow. The approximate amounts of fertilizer that should be applied to the soil in which

New "HN" Ejecto convertible for shallow or deep wells.

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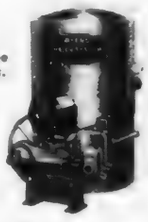
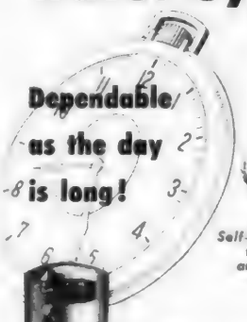
Reciprocating Type for shallow wells.



Myers water systems



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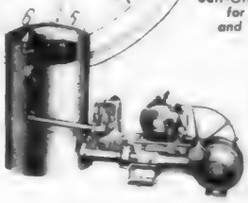

Self-Oiling "Bulldozer" for heavy-duty shallow well service.

24 HOURS A DAY . . . 365 days a year . . . you're sure of *steady* water service when your water system is a Myers. Top-quality construction keeps it operating with clock-like dependability — smooth and quiet running throughout its long and thrifty life. And most important, there's never a doubt about service from your authorized Myers dealer. He can supply *any* part for *any* Myers Pump, *any* time it's needed. He protects your investment! Right now is a mighty good time to see your Myers dealer. Coupon brings his name and free informative literature.

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Developed to serve as a permanent, living fence, to bring protection and economy to farming. Millions of Keeling plants have been used to fence farmlands.

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STREET or R.F.D._____

CITY_____ STATE_____

READING THE "COLORSTRIP" SPOTS

Result	What It Means	What to do about it*
NITRATE NITROGEN TEST:		
Powder remains white	Plant is deficient in N	Apply a nitrogen fertilizer (such as ammonium nitrate) in amounts depending on kind of plant and stage of growth. Check with county agent.
Powder turns a light pink	Plant is receiving just about enough N	Test again in week or two. Later deficiency probable.
Powder turns a dark pink or red	Plant has accumulated enough N for future growth	If in the middle or latter part of season, later deficiency is improbable.
		Apply Superphosphate 0-20-0 lbs./acre. / lbs./1000 sq. ft.
PHOSPHORUS TEST:		
No color	Plant is very deficient in P	600 / 15
Light blue	Plant is deficient in P	400 / 10
Medium Blue	Plant is slightly deficient in P	200 / 5
Dark Blue	Plant has enough P	None / None
		Apply Muriate of Potash 0-0-60 lbs./acre. / lbs./1000 sq. ft.
POTASSIUM TEST:		
All orange spots test yellow	All plants very deficient In K. Less than 1000 ppm in sap.	400 / 10
First spot (end) only tests orange	All plants deficient in K. About 1000 ppm in sap.	300 / 8
First two spots only test orange	K is adequate for such crops as corn, wheat, soybeans. 2000 ppm in sap.	100 / 3
All three spots test orange	K is ample for practically all crops, vegetables, flowers, lawn grass.	None / None

*Generalized approximate recommendations for building up the soil. Use the equivalent of the required amounts if mixed fertilizers are to be spread.

THE ABOVE CHART shows how to interpret the color on the tissue strips and how much fertilizer to apply to correct the deficiencies shown.

these plants are growing, to take care of this deficiency, is given above.

One of the most important uses of the tissue test is for trouble shooting, and county agents and other farm advisory leaders can use the tests in the field to find out quickly whether crops that are showing "hunger signs" really are growing in soils deficient in minerals or whether the plants have some disease. For instance the tissue tests would very quickly determine whether the brown edge on a corn plant was caused by potassium deficiency or whether Stewart's disease was present in the field.

While Roger Bray's tissue testing spots are an easy and inexpensive testing method, it cannot be said that they are without historical precedent; for, as Bray points out, the use of spots was mentioned even in Shakespeare's day "for don't you remember", he says, "It was Lady Macbeth who shouted, 'Out, damned spot!' Out, I say!" ".

The Farm Book Store has the Bray "Color Strip" soil-testing kit for readers who care to try this type of tissue-testing. Orders should be sent as soon as practical; delivery will be made in early Spring with fresh kits and chemicals. See Farm Book Store listing on page 124.

Test Your Soil

We Guarantee BIGGER BETTER CROPS

Here's How Soil Testing Works

Soil tests SAVE MONEY ON FERTILIZERS by showing just where you are using *too much* nitrogen or phosphate or potash. This can be determined *only* by testing your soil—there is no other way! The saving in fertilizers alone, frequently runs from a few hundred up to a thousand dollars, or more, depending upon the size of your farm!

Soil tests—and *only* soil tests—give you BIGGER AND BETTER CROPS by showing just where you need *more* nitrogen or phosphate or potash. Crop increases of 15% to 20% and 30% are common—many have *doubled* and *trebled!*

Here's How Quick and Easy It Is to Make Your Own Soil Tests

Maybe you thought soil testing was something only a chemist could do. Well, *SUDBURY* has changed all that! *SUDBURY* researchers developed wonderful new ways to make soil testing simple, accurate and fool-proof. So simple, you'll say its child's play. No knowledge of chemistry is required. In fact, there's nothing to know; nothing to learn. You can take your *SUDBURY KIT* anywhere with you—even right out in the fields and make tests on the spot!

Takes but a few minutes, costs less than 10c a test—tells at a glance whether nitrogen is needed, and exactly how much for every part of your farm. Or phosphate. Or potash. Tells whether your soil is acid or alkaline (pH), and how much lime may be needed to sweeten your soil for certain crops. Keeps you from wasting lime where not needed, or throwing money away on wrong analysis fertilizers.

SUPER DeLUXE MODEL... $24.95 COMPLETE

This Soil Test Kit is the result of years of research and development by the *world's largest makers of soil testing equipment.* Necessary accuracy has been combined with absolute simplicity and ease of use. Tests for nitrogen, phosphate and potash. Also shows whether lime is needed and how much. Comes completely equipped with built-in test tube racks and enough supplies (refillable) for hundreds of tests. Simple instructions. Scientific charts show needs of 225 different crops. Welded steel construction throughout to last a lifetime, yet light weight and easy to carry. Price only $24.95.

THIS IS OUR GUARANTEE

More than a quarter of a million *Sudbury Soil Test Kits* are now in use. In almost every instance, users report considerable savings in fertilizers, big increases in size and quality of crops.

Therefore, we GUARANTEE you will get *BIGGER* and *BETTER crops* as a result of testing your own soil with a *Sudbury Soil Test Kit,* and we agree that if you do not, you may return your *Sudbury Kit* to us anytime within one year and we will refund the purchase price *in full!*

You'll Be Writing Letters Like These!

Nearly Doubled My Yield! says S.G.H., Port Santac, Mich.

Saved $2 to $4 per Acre on Fertilizer! says W.L.D., Harrisville, Pa.

Worth 1,000 Times its Cost! says G.H., Bellevue, Ohio.

Has Boosted My Production on Corn 300%, Oats 500%, Wheat 100% and Hay 300%! says H.C.B., Montpelier, Ohio.

Start NOW to Make More Money

Every day you put off getting your *Sudbury Soil Test Kit,* you are losing money wasted on fertilizers you don't need! You are coming closer and closer to poor crops and low yield! Don't let another day pass! Start right now to get these savings for yourself—to get the greater income that bigger and better crops will bring!

SEND NO MONEY!—Order your *Sudbury Soil Test Kit today!* C.O.D. $24.95 plus postage, or send check or money order and we prepay postage.

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Send the Super deLuxe Sudbury Soil Test Kit at the new special reduced price of $24.95.

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Grow Stronger, Healthier CHICKS with any HUDSON BROODER

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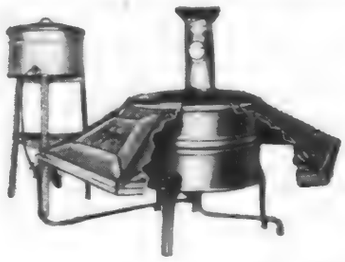
HUDSON MOTHER-HEN* OIL BROODER



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Up to 30% fuel saving with efficient oil-miser burner that never needs cleaning. Burner is draft-proof, provides steady heat at desired temperature, controlled by famous Hudson Micro-Tem Valve. Choice of three hover sizes: 48 in., 54 in., or 66 in. Start with one according to quantity and size of chicks; purchase other sizes if and when you need them. Six gallon oil tank (average two days' fuel supply).

HUDSON-HART* GAS BROODER

Clean—Dependable

Clay cones above burner reflect radiant heat. Automatic thermostat control. Entire burner assembly attached to hover. Only one burner, one pilot light. Wire guard encloses burner and radiants. Adjustable ventilation openings. Pilot always on – serves as attraction light. Adjustable legs raise hover 3 in. Easily interchangeable jets provided for use with propane, butane, bottled, natural or manufactured gas.

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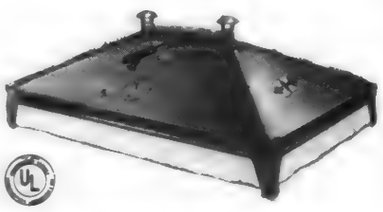

No refueling—no bother.

No work—no worry—completely automatic. Two powerful, fully enclosed heating elements. Balanced heat distribution with controlled ventilation eliminates moisture, keeps litter dry. Fully insulated. Adjustable legs allow extra head room as chicks grow. Economical operation (usually less than 1c per chick). Sizes for 500, 300, 100 chicks.

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HEAT FROM THE FLOOR

(Continued from page 77)

venience which brooders involve. Floor space is efficiently used, every square inch being available. For small chicks, an initial area of ½ square foot per chick is advised. Less space than this may result in overcrowding. Approximately 12 per cent more chicks can be housed in a floor-heated room.

Chicks will not pile up on a heated floor. Experience has shown that 800 chicks to a pen is the maximum for efficiency and 140 square feet the best size for a room. This permits efficiency in separation of sexes and age groups. However, because a larger room requires less labor, the trend is toward larger pens.

Chicks are somewhat like humans—if their feet are warm they can't be too unhappy. The heat from the floor rises naturally, and being lighter than cold air, creates a natural circulation which warms the room evenly throughout.

While litter is not necessary with floor heating, most chicken men will want to use it. The heated floor keeps the litter dry, cutting down at least 75 per cent on the labor of changing and keeping it dry. If no litter is used, droppings are quickly dried, sanitation is improved, and cleaning is easier.

THIS LAUNDRY STOVE would be more efficient if its heat could be channeled under the floor.

No brooder can compete with floor heating in maintaining a constant room-wide temperature. A thermostat installed 2½ inches above the floor automatically regulates the temperature on automatic systems, and there is no variation in different parts of the room. Make-do systems which are not thermostatically controlled can be regulated by hand-operated dampers.

One advantage mentioned by some users of floor heating turns out to be double edged. Donald Bernard of New Vienna, Ohio, feels that an important advantage of floor heating is that the floor slab will retain heat for long periods of time even though the furnace might not be operating. This same factor is listed as a disadvantage by the Hy-Line Poultry Farms of Des Moines, Iowa, who point out that when sudden warm weather comes during brooding it is impossible to avoid overheating because the floor slab loses its heat slowly and can't be adjusted immediately to the changed conditions.

The starting floor temperature for chicks should not be lower than 92° and not higher than 100°F. These temperatures are reduced 1° to 1½° per day until a low of 85° F. is reached after two or three weeks. Only a few hours are needed to bring the ordinary room

to the proper temperature.

For poults the starting temperatures should be 95° to 98° for the first day or two, reduced 5° every week down to 80°.

No change in management or plant is needed if the raiser wishes to continue with his fowl on the same floor. The temperatures are simply lowered and feeding and bedding continued as before. There are no brooders to move and maintain, but roosts and nests must be moved in.

One of the big advantages of floor heating is the reduction in costs of operation. How much reduction in heating costs depends on the system, the kind and price of fuel, the size of the poultry house, and the extent to which it is used. Under certain circumstances, floor heating may be lower in cost than any other method of warming the poultry house. This is particularly true for the relatively simple hot-air systems described above. But even the most expensive and efficient system (hot water or steam circulating through pipes laid in a concrete floor) which calls for a relatively higher initial investment, in the long run will prove the most economical wherever labor cost and fuel prices are high, and surely on large poultry farms whose brooder and laying houses are in use to full capacity practically all the time. In an average enterprise, the cost comparison between conventional and modern floor heating system is also pretty encouraging—the more so in those plants where large lots of poultry are brooded the year 'round.

A survey of 104 chicken farms of Rockingham County, Virginia, showed fuel per 1000 birds in houses heated in the old-fashioned way cost $24.20 against $6.80 in modern radiant heated houses, a saving of $17.50 per 1000 birds.

It is in labor costs that floor heating effects the big savings. Labor under the old-fashioned method of heating (with brooders) was 167 hours per 1000 birds; with floor heating, 35 hours per 1000 birds. The higher the cost of labor the more saving, but at a low of 50c per hour the savings is $66.00 per 1000 birds.

With floor heating there is only one stove to tend; cleaning the room is simple, and the chicks require less attention. Since no spot on the floor is warmer than any other spot, the chicks scatter more or less evenly over the entire space, and they take no time out crowded under a brooder. They eat constantly and grow faster. Repair and maintenance of floor heating systems is negligible as compared to the old systems where brooders require a large outlay of labor and materials. There is no danger from carbon monoxide poisoning such as there is with brooders. If a pipe bursts, flow of water usually continues. Wrought iron pipes have the same expansion rate as concrete. Efficiency is lost if the pipes are laid in cinders. A system should be shaken down before the top layer of concrete is laid.

There are other savings which can not be expressed in dollars and cents: Increase in sanitation, dry litters, practically no fire hazard, vigor of the birds, reduced susceptibility to disease and greatly reduced mortality are among them.

On the John W. Eshelman farm at Lancaster, Pennsylvania, radiant heating was installed in 1946 after fire had destroyed the old boiler house. The new house, a block long, two story structure, is in continuous use with a capacity of 38,000 chicks at one time, 19,000 to each floor. The new house uses hot water heat which is forced through three miles of pipe by four 1/6 horsepower pumps. Two coal furnaces, each with a 40-inch fire box, heat water to 115° to 130°. To maintain a room heat of 80° to 90° in zero weather

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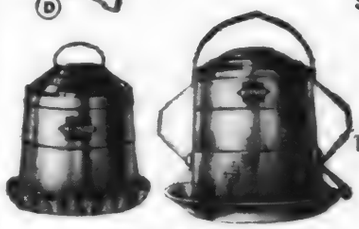
Sloping sides keep feed sliding to bottom without packing in corners. Permit chicks to get up close to feeder. Feed-saving lip reduces "billing out." Non-roost reels or grill.

A. HUDSON CHICK FEEDERS
One-piece heavy lacquered steel. No seam. 3 sizes: 18-in., 24-in., and 36-in.

B. HUDSON CHICK and GROWING FEEDER
End stands quickly adjustable. 2 sizes: 36-in., and 48-in.

C. HUDSON BROILER FEEDER
Wing nuts permit easy height adjustment for chicks 2-weeks old up to broiler weight. Choice of hinged grill (shown) or reel.

D. FEEDER WITH FOLD BACK STANDS
End stands quickly adjust height for small or large birds. 48-in. with reel; 60-in. with grill.



Sanitary Ezy-Fill* Chick Fountains

Individual cups shaped into bottom pan prevent chicks from getting into and fouling water. Cupped pan fills twice as often as ordinary pan; keeps water fresher. One gal. and two gal. sizes.

Ezy-Fill Growing and Flock Fountain

To fill, just remove pan, reverse handle and use as pail! Easy to clean, handy to fill and carry. Special saucer shape pan. Makes drinking easier; prevents wading. 3 and 5 gals.

HUDSON Double-Wall Fountains

Patented air-groove lets air enter fountain without gushing. Self closing valve. 3 and 5 gal. sizes.

HUDSON Automatic Trough Waterer and Automatic Valve

At last—a foolproof, fully automatic valve! When trough is full, weight of trough and water pulls valve shut. As water is drunk, valve automatically opens to let water flow. Valve shuts automatically when trough is removed. Holds four quarts—use one for 500 chicks.

Automatic valve with chain also sold separately.

* TRADEMARK

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the water temperature would be about 130°. The pipes are 1¼-inch welded steel, laid 15 inches apart. There are six 16-inch ventilating fans on each floor.

Eshelman figures that he has made a saving of 30 per cent on his fuel—an important item since he uses one and a half to two tons of coal a day. He also figures a saving on building cost per bird since he can house 12 per cent more birds than he could using brooders in the same size building. There are no divisions in the two large rooms. His fire insurance rates are lower, and he runs no risk of carbon monoxide poisoning from faulty stoves. As for labor, one man handles 38,000 chicks up to seven weeks.

In costs of installation lie the real disadvantage of floor heating. This is considerably higher than for the old-fashioned system of brooders. In a recent survey which covered nine poultry farms where both systems are used, the cost per square foot of floor heated new brooder houses was $1.72; the cost of the old brooder houses without floor heating was $0.62. However, the new houses were put up recently under high labor and material costs while the old houses were put up before the war at comparatively low costs. The new houses are ultra-modern, with hot water pipes laid in concrete and efficient boilers. Less pretentious floor heating systems could be installed at a figure closer to the costs of the old systems. The higher insurance, the higher taxes, interest, and depreciation are included in the $1.72 given above.

The actual unit costs of floor heating to the individual is only a guess, depending on what type of boiler, furnace, pipes, etc. are used, and the costs of the labor. Heating units can range from a home-converted boiler to a regulation hot water furnace such as those used in homes. The cost to the individual poultry raiser had best be figured on his home base.

The costs will vary depending on the type of operation and the cost of labor. W. E. Wright, of Mitchell County, Iowa, for example, believes that the more than 50 per cent increase in efficiency of labor on his turkey breeding farm will in time pay for the new type brooder. The new building is 60 by 200 feet and will house 20,000 poults and 3000 breeding hens. The two-story house has three and one-half miles of copper pipe running through the floors. Each floor has its own heating system plus an auxiliary heating system which heats near the ceiling during sub-zero weather. Wright figures that where he and two other men were required to take care of 10,000 birds with the old system, they will now be able to handle 15,000 to 18,000 in the new building.

THE AUTHOR: Rudolph Seiden makes his second appearance as an author for *The Farm Quarterly* with this article. His name has appeared in the book review column, however, and in the Farm Book Store page as the editor and chief author of the Poultry Handbook. Seiden was born in Austria some 50 years ago and had established himself as a chemical engineer before he came to this country in 1935.

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HOW TO BREAK AN OX

(Continued from page 78)

a fellow needs heavy cattle to pull heavy loads. I personally like a little Jersey blood in my oxen; it gives them stamina. If you don't get beefy types though, you may lose money on them, especially if they don't turn out well. Get some little old knot-head fool, work with him a couple of years, and find he won't learn, and you lose money on him."

On the average day around his sawmill, Holton yokes only one team of oxen, because one team will move most of the logs he has to handle. Occasionally, though, he has a giant sized log to move and he goes out to the pasture field for the other four work animals. When the three yoke are hitched in tandem Holton figures they could pull his barn off its foundation, and his barn is a big one that wasn't built on runners. At least this is the story he tells other ox drivers when he meets them

Buck and Peck are his wheel yoke. These large red cattle are his oldest and best trained. They seldom make a move unless Holton says to, and even in a crowd they pay no attention to any one except their driver. The middle team is somewhat smaller and unfortunately has no horns. This cuts down their resale value, for present day ox owners want showy animals that cut a figure at county fairs. The lead team in Holton's stable line-up is a pair of matched white twin steers. They are still small at two years of age, but Holton expects them to get bigger than Buck and Peck. Three yoke are enough for Holton, and he usually has a pair of calves coming along to replace older stock that might meet with mishap or be retired.

But three yoke of oxen in this day represents no small investment. "My oxen are worth $2,000," Holton says, "at the present prices for work horses they're as valuable as 50 horses. And I doubt that I'd sell Buck and Peck at any price." And his reasons for not selling his big wheel team are sound. He considers them the best looking oxen in his part of the universe and if he sold them, the person who made the purchase would get all the invitations to go to fairs and expositions that now come to Holton. These celebrations mean money to the soft spoken Holton who charges $50 to $60 for hauling a yoke of his oxen to a show.

How to Train an Ox

Holton says there is no secret to training an ox. "What you really need to train oxen successfully," he explains, "is a lot of patience. The oxen and the driver have to learn to talk the same language, and this takes time."

He likes to start training his animals when they are about one year old. Usually he begins this cattle kindergarten during the winter months when there is

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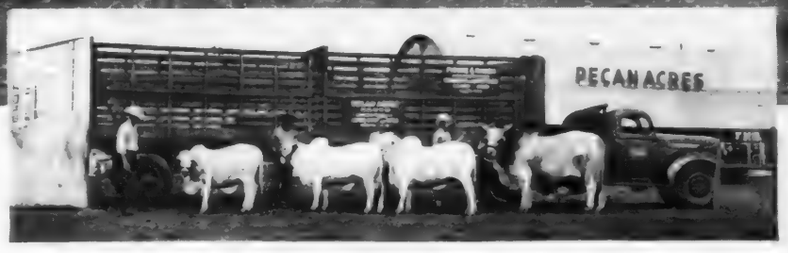

Mr. Vernon W. Frost (left) and Mr. O. J. Schutte, ranch foreman, prepare "Jumbo Vickie No. 13" and family for a fast ride to the livestock shows in this GMC truck, equipped with Eaton 2-Speed Axle.

J. C. Peterson, sales manager of the General Truck Company, GMC distributors of Houston, says: "The Frost truck has had no axle trouble in five years. We have sold over 500 Eaton-equipped GMC's in the past year — Eaton Axles go with GMC's like ham goes with eggs!"

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"The Eaton 2-Speed Axle gives my GMC truck *ten speeds forward — double the normal number*," points out Mr. Frost. "It enables my truck to do many jobs easier and with less wear and tear — hauling lumber, baled hay, pecans and other heavy off-the-road work. And on the highway I get fast time-saving passenger car speed."

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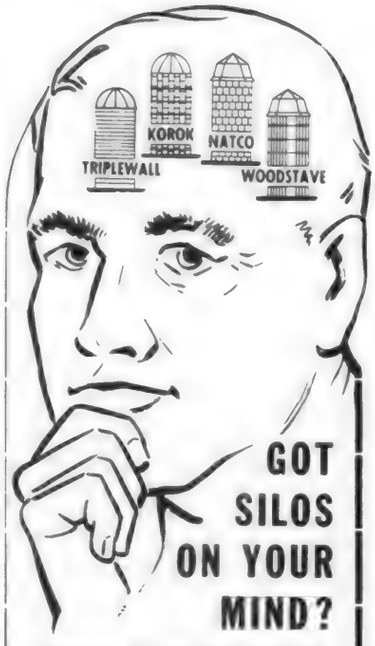

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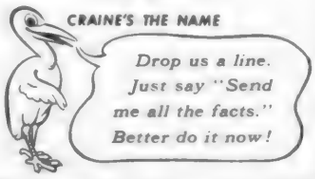

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more time to devote to the task. The first step is to teach them to lead with a rope. This serves two purposes: it teaches them obedience, and also prevents runaways, always a risk with young steers.

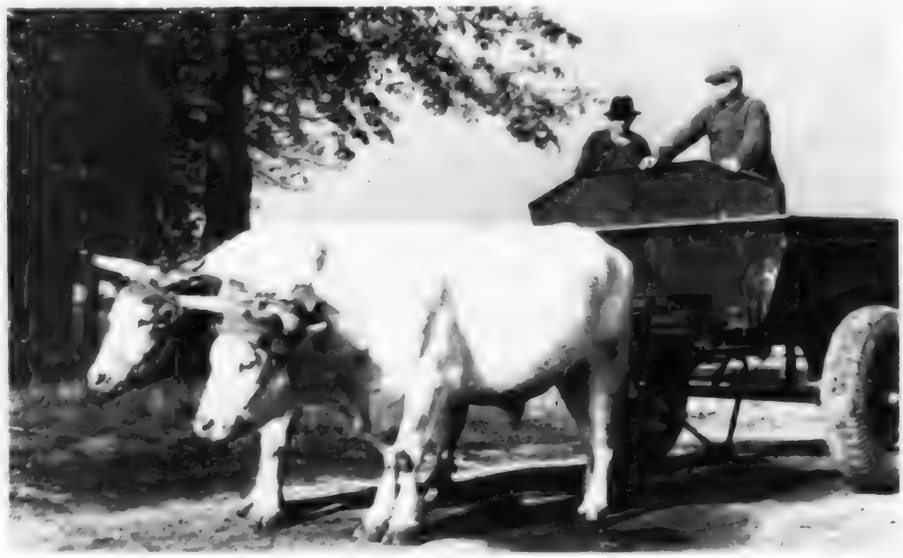
Once they'll lead easily Holton begins the long, tedious job of teaching his oxen to understand a few words of the human language. Within four or five months he has them well enough trained to work them by command without touching them. "A really well-trained team," he says, "will do what you tell them from any place within hearing distance."

The commands an ox driver employs serve the same purpose a gear shift and steering wheel serve on a truck. Every driver has his own set of commands and this often makes it difficult for a stranger to control the animals. "I bought my first yoke," Holton says, "after they were broke to work. Now I could have taught them a whole new set of commands, but I figured it would be easier for me to learn the language the former owner had talked with them." A bystander looking on while Holton moves his oxen from one job to another will soon learn that he makes the oxen start by a deep throated "Come up." Later a motion with the whip may serve the same purpose. To turn his team left he says "Come here" since he usually works them from the left side. The oxen turn right when he says "Gee back," which Holton admits has been corrupted to the one word "Back." This is much the same as the "Back up" order for putting the team in reverse. "The difference," he says, "is in the tone. When I say 'Back up.' I say it like a crow would. 'Stopping them,' " he adds, "is easy; sometimes too easy. I just say 'Whoa.' "

The whip is to the ox driver what the baton is to the orchestra leader. Holton resents the fact that most people think ox drivers use their whip to beat the animals. He admits that during training of young oxen the whip is often used lightly and with discretion until the animals learn the commands. But even so, it is used most often merely to tap the ox on the head or the heels and remind him that he should turn when and where he is told to turn.

A young yoke of oxen can be worked without much training if hitched with a yoke of older animals. They will follow the trained team and work right along with them as long as they are hitched together. 'The trouble," says Holton, "starts when you take the young team out to work by themselves."

A young ox can also be worked behind a horse, and this is a trick that some ox drivers still use. Some also use bridles and bits complete with reins on oxen, but Holton thinks this is a waste of time and too much trouble. "One reason I like to work oxen," he says, "is because there aren't a lot of straps to get tangled up. If I'm going to use bridles and all that stuff I might as well work horses."



THE FRENCH PREFER OXEN for two reasons: power, and manure. This farmer with his rubber tired cart has made only a partial concession to the machine age.

All of his oxen will, as he explains it, "Come under the yoke." Oxen trained for this nicety will come up to the driver when he holds the yoke up, and stick their heads into place. The yoke replaces the harness on horses. It is the only equipment except for a chain that Holton uses on his oxen. The chain runs directly from the yoke to the load. Holton figures that, pound for pound, oxen will pull as much as horses, and while horses will lunge in the harness on a heavy load, a team of oxen will lean into the yoke and pull steadily until their bellies touch the ground. Because of this steady pull oxen can pull a heavy load with a much smaller chain than would be used for horses.

Holton works his oxen the year 'round. Oxen, like most draft animals, must be toughened to work before the hot summer weather comes. If they have worked all through the spring, however, and have been well cared for, they will work all day

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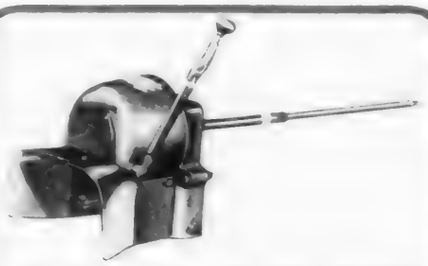

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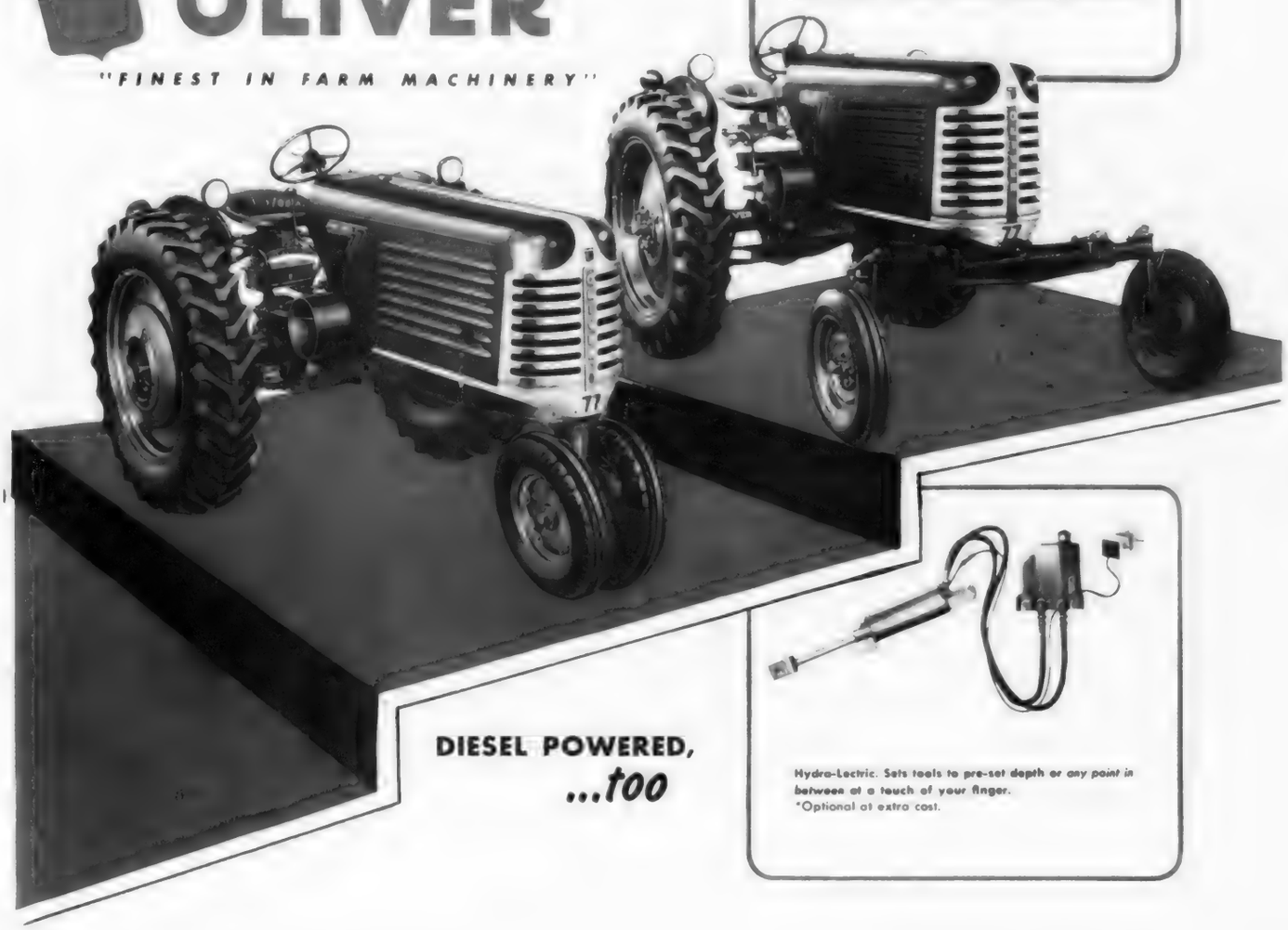

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in the yoke throughout the summer and apparently not be bothered by the heat.

Holton sees that his animals have ample feed. During summer they are kept on good pasture and winter they are fed mixed hay. When they work they are also fed portions of cracked corn and cob which helps keep them in flesh and better enables them to stand hard work.

Why You Don't Work Oxen

Oxen, Holton figures, have a lot to recommend them, but on the other hand he thinks there are good reasons why so few of them are around in this age of the jet plane and the motor scooter. Few farmers have the patience to work with them. They will learn to follow a furrow all day and are good for plowing, but few farmers want to plow that slow any more especially when they can plow three times as fast and ride while doing it.

Actually, however, Holton isn't unhappy because of the scarcity of oxen. If they were not a novelty when displayed before crowds, he would have to keep his animals at home, and as it is they are well traveled beasts.

Last year his wheel team of big reds, Buck and Peck, performed before admiring eyes at 14 parades and fairs. Holton thinks little of leading them into his small truck and hauling them 200 miles for an exhibition. And wherever he stops the truck the oxen are at home.

Usually at these gatherings the oxen are hitched to a log, or perhaps an old covered wagon that some county fair manager has wheedled from a nearby museum or antique dealer. Buck and Peck are well behaved on these trips. "They won't even throw their heads at flies when they're in a crowd," their owner says. "They watch every move I make so they'll know what I want them to do. Why, you couldn't carry all the pictures in a bushel basket that have been taken of those cattle with kids on their backs. And there are a lot of old men, too, who want to sit on them and have their pictures taken: why some of those old men never saw a yoke of oxen before. It's a shame."

At some large gatherings Holton may be only one of half a dozen drivers invited to bring in their work cattle. At one fair last year he displayed all three yoke of his oxen beside four other yoke brought in by acquaintances of his. To top the celebration off all seven yoke were hitched in tandem to a huge log that Holton said came up to his chin and made a track in the mud two feet wide. Holton's team was in the lead and it took a little maneuvering to get the log started. "Why, my three yoke could have pulled that load, but the others carried their own weight.

"I had to straighten those cattle out and get that log started to turn. There was an open tent right in front of us with some ladies sitting behind a table inside. I figured there was room enough to make the turn without tramping the tent down so I just let Buck and Peck go ahead. They walked right into that tent and had their heads hanging over that table when I said 'Whoa.' Those women thought I was going to drag that log through their tent and they were looking for ways to get out the back. But I knew there was room. Why, I turned Buck and Peck and they walked out of that tent without touching a rope."

Holton doesn't bother with a lot of grooming when he heads for a parade. "Oxen were never meant to look fancy," he says, "so all I do is run a curry comb over their coats and maybe touch up their horns with some fine sand paper." Buck and Peck have a fine set of horns that spread out and point skyward. They're tipped with brass knobs which serve only as decoration.

When an ox has horns that fall short of the ideal all is not lost. Holton and other owners know that there is a lot that can be done about training the horns to point in the proper direction. "I want my oxen to have horns that point upward," he says. "When they're working in the woods and get their horns hooked in grape vines they can throw the vines off easily with a toss of their heads. If the horns point down they may have trouble and might even break off a horn getting out of the mess."

This winter Holton is working with the horns on his small yoke of whites. He wants them to point upward more than they do. He has rigged up a light rope attached to each horn. The rope runs through a pulley at the top of the stall and there is a couple of pounds of weight on the end to exert pressure on the horns. If he wanted to pull the tips down he would hang a weight on each one. Or, if the horns pointed upward and the owner wanted them to point in he could connect them with a wire and each day give the wire another twist or two to increase the tension. After five or six weeks the horns are off to the proper start in life and the owner is just a little prouder of his animals. The selling price might even go up and this is never considered a disadvantage.

Since he works his oxen only on soft earth, Holton seldom worries about shoes for them. The blacksmith who can shoe an ox is even more a rarity than the ox. Holton knows of no place where he can buy the peculiar half-moon shoes that oxen wear.

Holton expects to have oxen from now on. They work well in his woods, and he gets along with them. "In fact," he says, "I get along with them a lot better than I do with my tractors, and I owned the first tractor in these parts."

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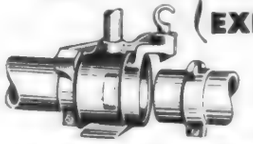

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HOW TO SAVE SILAGE

(Continued from page 65)

little at a time, because the cap can be removed and replaced again after a new section of the silo is filled. When a silo is filled in several steps the cap can save the silage that must ordinarily be taken off as spoilage after each filling. The cost of the cap for a 12 foot silo is slightly less than $50.00, and it lasts four or five years.

Another company that has done something about spoiled silage in recent years is the A. O. Smith Company of Milwaukee. This company designed a revolutionary new type silo, which, like a sealed tin can, is air tight. The silo is made of glass coated steel which isn't damaged by acids or rusting. The top of the silo is made as airtight as the sides, and once filled, the structure can be locked to keep out air. A major advantage is that this silo can be filled a little at a time throughout the season. Silage is removed from the bottom of the silo with a mechanical silo unloader. While somewhat more expensive than old type silos, this one is held in high esteem by farmers who have tried it. Erected and equipped with unloader such a silo measuring 14 x 40 feet costs about $4,000.00.

Farmers are finding that good grass silage can be made without adding anything to the chopped forage. Ground corn and cob meal, molasses, and other substances do little to help keep silage from spoilage. They are conditioners and appetizers more than preservatives. They are called conditioners because they usually add to the palatability and total nutrient content of silage thus increasing its value as feed.

One of the most promising fields for research in methods of saving silage is that of treating the silage with chemicals. Still within the realm of fancy is an idea that has occurred to some research men of mixing some, as yet undiscovered, bactericide with silage to kill bacteria and thus prevent spoilage. Some work has been done with the use of sulfur dioxide which shows an ability to reduce fermentation and spoilage without harming the livestock. The cost of sulfur dioxide for the treatment of 200 tons of silage is about $200.00.

One secret of making silage keep well is to make good silage in the beginning, and silage is seldom at its best unless the crop is harvested at the right stage of maturity.

A forage crop is best harvested for silage at the time the same crop would be cut for hay. Crops cut either too early or too late result in a lower grade of silage. A few guiding rules can help the farmer determine the best time to fill the silo. If the crop is over 50 per cent legume the silage should be made when the dominant legume is coming into bloom. It can be taken a week earlier without sacrificing anything but yield. If the dominant crop is grass, make silage when the heads are 50 per cent out. If rains or machine break downs cause delay, the owner has sacrificed not yield, but palatability, which is still more important. If the mixture is well-balanced between legumes and grasses, it can wait until the legume is in one half to full bloom, but as legume crops approach full bloom let them wilt less before they are fed into the choppers. It is seldom wise to cut ahead of the choppers more crop than can be ensiled in a half day.

The best forage mixtures for silage range from 25 per cent grasses and 75 per cent legumes to 50 per cent grasses and 50 per cent legumes.

The farmer's handiest method of telling when the crop is in good condition for ensiling is still the old-fashioned "grab" test. He picks up a handful of the chopped forage, squeezes it as tight as he can, then opens his hands. The forage in his hand tells the story: if the ball is juicy it is too wet to ensile alone. If it comes back slightly, but holds the shape of the hand and is merely moist, it can be put into the silo in its present condition. If it fluffs up into a pile in the hand it is not moist

MOLASSES in silage does not prevent spoilage, but cows like its taste and eat more.

Your *cheapest* feed is grass!

A representative of the United States Department of Agriculture has estimated that a field of grasses and legumes can supply up to a *third more total digestible nutrients—and considerably more protein*—than if planted to corn and small grains.

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- Four-knife flywheel for slicing, not scissor action.
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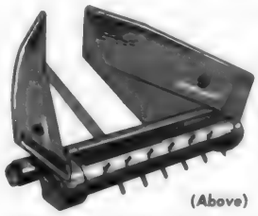
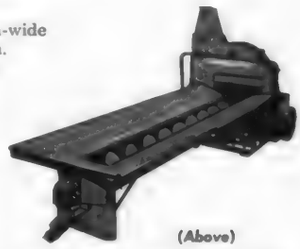


(Above)

Windrow attachment is for grass, semi-cured hay or dry hay. Special alloy fingers lift hay gently to apron. Will handle up to 6 tons of chopped dry hay per hour . . . 8 tons of semi-cured hay.

(Below) **Row crop attachment** has extra-wide gathering points for better operation. Cuts corn stalk at butt, lifts it onto feeder apron base first. Will chop and blow up to 20 tons per hour.



(Above)

New tilt-table blower has low 22" operating position. Moves up to 30 tons of chopped hay per hour . . . 40 tons of silage.

(Below) **New power take-off forage harvester** can be operated with full efficiency from tractor with power take-off of 31 h.p. or more.

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enough to guarantee good silage without layering with more moist crops.

One critical factor in the making of good silage is the moisture content of the forage crop. When there it too much moisture the silage gets soggy. If it is too dry or contains too much dry straw the silage gets fluffy and traps air. Succulent young forage crops usually have a high moisture content and should wilt from two to four hours in the windrow before being blown into the silo.

Ground grains will help take up some of the excess moisture in a crop that is too wet to ensile. In addition, the grain will add to the feed value of the silage and make it more palatable to the stock. The best grain to use is the one most readily available. In many parts of the Midwest this is ear corn. It should be ground to pass through a one-fourth inch screen. Grains are especially valuable for improving the flavor and odor of pure legume silage. Very young green crops can be treated with 200 pounds of grain per ton of chopped forage if ensiled when very wet. Meadow mixtures at the right stage for hay may be treated with 150 pounds. Older mixtures will probably not benefit from added masses.

Winter, with its freezing temperatures, brings its own silage spoilage problems. Silage will freeze in severe temperatures, and frozen silage should not be fed. Once the silage is thawed it can be fed before it has time to spoil, but it decays rapidly. The farmer can manage the unloading of his silo to get a minimum of frozen silage by following a few basic points.

Temperatures within a silo change slower than those on the outside. They change fastest near the wall, and it is usually the outside four or five inches of silage that freeze. Silage also freezes on top surfaces and here is the farmer's best chance to keep freezing to a minimum. The best shape for the top of the fill is similar to the shape of an inverted pie pan with the center level, and higher than the outside edges. By failing to take silage out of the silo in even layers the farmer exposes more of this feed to freezing. He should leave no ring of silage next to the wall, for this invites freezing and eventually spoilage. When thawing weather comes this silage may spoil before it can be fed. The ring should be kept down by the use of a digging bar. A two-inch layer taken off each day should keep good silage available all through the winter. This silage will help him keep cows healthy and milk production high.

RESEEDING CRIMSON CLOVER

(Continued from page 45)

sandy loam, farmers and ranchers aren't used to spending too much money on fertilizers, although many are being converted. Most of the land is not as badly farmed out as in the southeast, and where southeastern farmers only recently developed an interest in livestock, most Texas farmers who grow crimson are cattlemen or dairymen first, crop farmers second.

This means crimson raisers in the Southwest worry less about reclaiming land than about putting weight on beef cattle. East Texans use balanced fertilizers such as 4-12-4 or 4-16-8, 500 to 800 pounds per acre. The nitrogen can be left out of crimson fertilization after the first crop reseeds. It is customary to apply fertilizer at the time the soil is broken or disced, prior to seeding.

Inoculation—Clover Insurance

Inoculation is another must in making crimson clover a paying crop. Thorough seed inoculation usually is accomplished by using twice the recommended amount of commercial culture. Adding syrup to the mixture, when inoculating, enables the seed to get a good bath in the culture prior to planting. After inoculating, most crimson planters will tell you, a hot sun is crimson's worst enemy. Bright sunlight is deadly to culture, so planters usually pick a cloudy, overcast day to seed crimson.

Once growing, reseeding crimson has few enemies in the bacterial world, practically none in the insect kingdom. Nematodes sometimes get into the crop if it is on sandy soil. Some crimson pastures turn up an occasional infection of sooty blotch or crown rot. For sooty blotch, one Alabama farmer had a ready answer. "Graze the hell out of it," he declared, explaining that the humid lower leaves of the clover become affected by the excess moisture and lack of air. A short period of heavy grazing, he had found, helped wipe it out.

Crown rot is more serious, although it is rare. It often requires eliminating crimson and other legumes from a pasture rotation for from three to five years.

The Payoff—I

Don't be too surprised one of these days if you find a harvesting device on the market that looks suspiciously like a vacuum cleaner. Most likely it will have been devised by some crimson clover booster who didn't get all the seed he thought he had coming from his pasture. Texas growers this year were calling for a vacuum attachment that might fit on a combine. This stems from the fact that an ill-timed wind or strong rain can reduce a crimson seed crop from 300 available pounds per acre to less than 50 in a few unhappy minutes. The harvesting period is limited. Using a combine, 200 pounds per acre are the rule, 400 pounds exceptional.

Check now how you too can have an immediate saving in seed cost!

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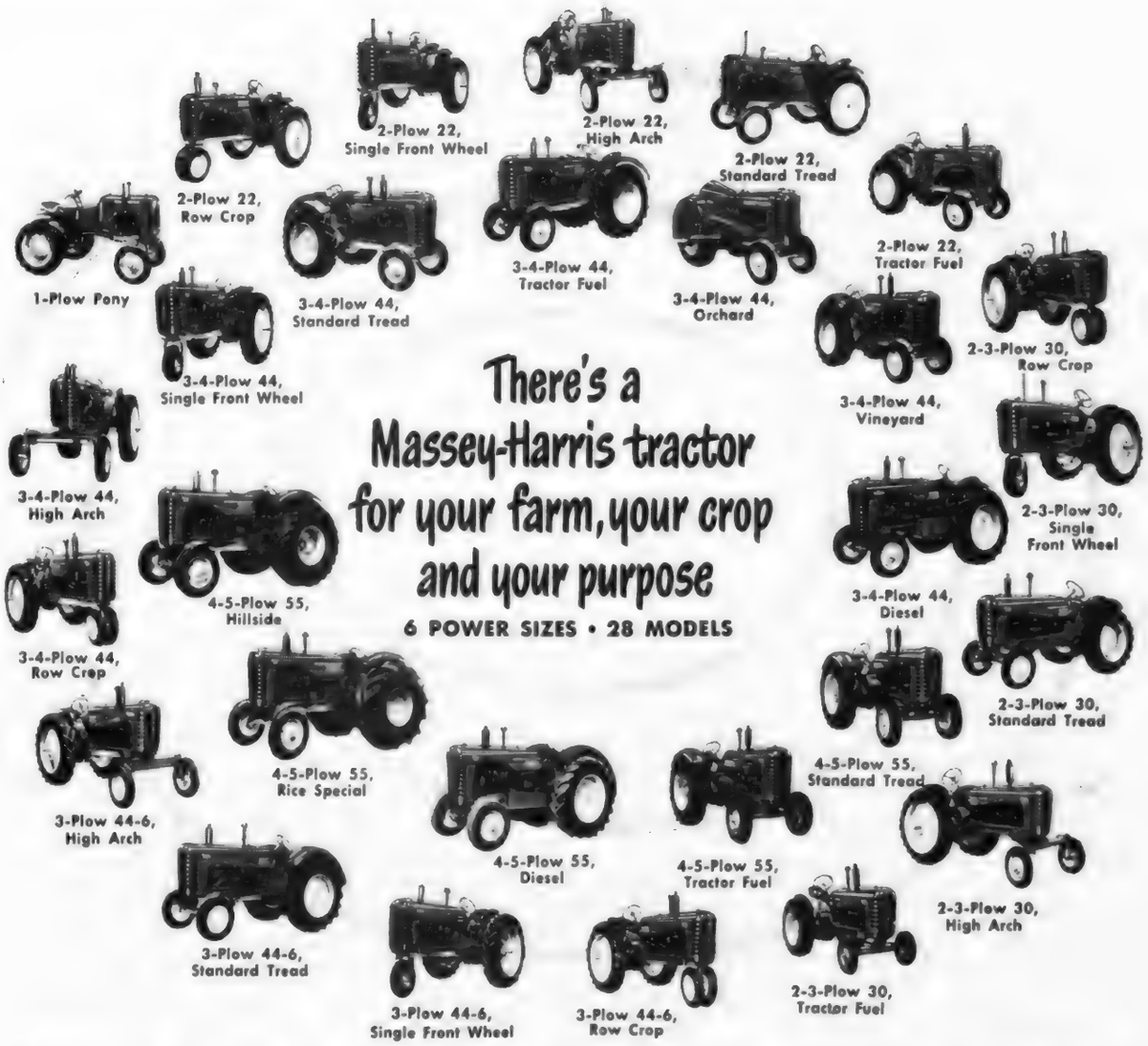

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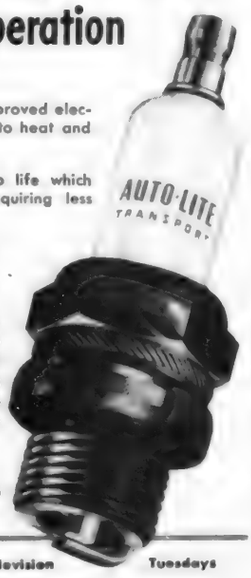

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Given a stable spell of weather about the middle of May, most reseeding crimson clover can be harvested direct with a combine. The most common test for clover ripeness is to grab a handful of seed heads and pull. If about 75 per cent strips off easily most crimson experts start harvesting as quickly as they can beg, borrow, or rent a combine. They avoid the early morning hours when combining direct. The seed weighs about 60 pounds per bushel.

Another harvesting procedure is to windrow the crimson before quite ripe, using the pick-up attachment later. This is supposed to save seed and make the most of dry spells, but some farmers don't like the moisture that can form in windrows, plus the added expense of another operation.

Still a third crimson harvesting process is that of cutting the clover with a mower when 60 to 75 per cent of the heads are dark brown and allowing it to lie in swath about three days. Then the clover is picked up with the combine guard teeth, heads first, to prevent shattering of the seed. While some farmers use a pick-up baler to help in handling, the less crimson is handled the bigger the seed yield will be. Some growers use a lespedeza screen in place of the regular clover screen on the combine to boost the yield. Although crimson clover is called self-fertile, honeybee colonies next to blooming fields boost pollination and the number of seed per head.

Many troublesome weeds are difficult to separate from crimson clover seed, including field peppergrass, wintercress, and the bulblets of wild onion, which are probably the worst. Seed of the mustards, rapes, and turnips, dock, wild geranium, sorrel, and catchweed are also found in the seed. Little barley is a pest in unhulled seed, and the use of such seed will naturally increase the prevalence of this weed.

The Payoff—II

Southern livestock men find reseeding crimson clover good eating for their stock, and they get their first mouthful when the clover is from four to six inches high. It's not unusual to start grazing in late November. Rotation grazing can help make that possible.

Crimson planters can get 25-50 per cent more grazing when they keep livestock on one crimson pasture for about a week, then switch to the second. Fencing off the pasture allows one to regain its growth while the other is being grazed.

A bellyful of crimson for cattle consists of 75-125 pounds of the crop, usually consumed at a one to two hour feeding. Mid-morning feeding is customary since early dew raises the danger of bloat. Growing crimson in combination with a grain crop is good anti-bloat insurance. So is hay fed to livestock before grazing.

When crimson clover puts on its colorful head-dress in April, the grazing period is about over. Some cattlemen in the South, desiring no seed harvest, graze well into May. They stop grazing, though, when the heads and stems of the clover grow hard. This can form hair (the coarse, mature hairs from the clover itself) balls in the stomach of both horses and mules, although it doesn't seem to affect cattle, sheep, or swine.

In the past two years, because of the high seed demand, more cattlemen are passing up the grazing and harvesting seed in April. Most seed associations in the southeast feel the demands for crimson seed—currently far above the supply—will keep the market good for at least five years more.

But for the long pull the future of this crop does not seem to be in the hard seed business since it does not compete well with other annual legumes in permanent pasture. Its value is in its use for a temporary pasture in fall and winter, and in soil erosion control and as green manure. Since crimson does not reseed well in permanent pastures, it can not compete with lespedeza, white clover, and alfalfa in permanent pasture mixtures.

A Soil Builder

However, to some growers it is not in seed but in the soil building and grazing that crimson pays off best. In Tennessee, tests have shown that winter grazing of Balboa rye and crimson

clover increased milk production, saved feed, and could be recommended for all but a few days in winter.

R. H. Lush, Professor of Dairying at the University of Tennessee, says that a 150 day test showed that cows on the pasture from three to five hours daily produced 65 per cent more milk, ate 39 per cent less hay, and returned 55 cents more per day above feed costs than barn-fed cows.

And crimson is a top-notch green manure crop. As green manure, crimson usually is plowed under two or three weeks before the following crop is planted to give time for decomposition. Turning under an acre of reseeding crimson roughly equals the appplication of 400-500 pounds of nitrate of soda or from eight to ten tons of barnyard manure.

Because of crimson's seed potential and its qualities as a soil builder, comparatively little hay or silage is made in the South from it. When made into hay, however, reseeding crimson will yield from a ton and a half to two tons per acre. When used for hay, it should be cut in the early bloom stage, although this may reduce the yield. It is easily cured either in the swath or windrow. It is usually cut in mid-April, just before fall bloom.

J. B. Neighbors, of Autaugaville, Ala., last year netted $78 per acre from his seed crop. "But," he says, "For grazing, soil protection and soil building, we think the value is almost equal to the seed worth."

It cost Neighbors about $30 per acre to establish and fertilize his reseeding crimson the first year, and about $7 per acre for fertilizer in succeeding years. He plants in combination with Johnson grass, sericea, Bermuda, fescue, and white Dutch clover; he follows with grain sorghum, corn, or soybeans.

More Growers

A Georgia crimson enthusiast and Hereford cattleman, S. A. Nunn of Perry, Ga., eighteen years ago bought crimson clover seed in the chaff and paid eight cents a pound for it. His neighbors were skeptical. Georgia then had few if any big herds of beef or dairy cattle. When Nunn's pasture of 75 acres reseeded for eight consecutive years his neighbors began to ask questions. Many Alabama fields have reseeded themselves for ten years. Usually a farmer likes to drain off the surplus of nitrogen with another crop, plowing under the clover.

Among the 250 east Texas farmers and ranchers who grew reseeding crimson this past spring was Cliff Rampy of Montgomery County, an Angus breeder. His 45 acres of crimson, on rolling sandy loam, furnished grazing for two animals per acre from December to April 15. It grew two feet before harvest time, produced 200 pounds of seed per acre, and netted Rampy a $60 per acre profit, not counting the weight his beef cattle gained and the minerals his soil gained.

The Wadsworth brothers of Prattville, Alabama, worked out a five year rotation plan with cotton and reseeding crimson. A 30 acre field on their place produced four good stands between 1945 and 1948. In early '49 the crimson was turned as green manure. Cotton was planted in April. A stand of the crimson came back in the fall of the same year, the seeds had lain dormant in the soil since the spring of 1948.

Southern farmers sense the big change in farming—row crop acreage is being cut by controls so there is more widespread interest in sod crops and more care in their production. As more and more farmers turn to a grass economy and as year 'round grazing is developed in the South and North, reseeding crimson clover will sell itself. It will not need the promotion which is very likely to backfire if pushed too hard, but will find its slot in the rotations, soils and management of well-run farms wherever it can be grown.

THE AUTHOR: Robert S. Gray, a young lieutenant in the Marines in World War II, and presently very concerned about his civilian status, divides his time between newscasting on a Houston, Texas, station and free lancing in the farm field. He attended four colleges and is a photographer as well as a writer.

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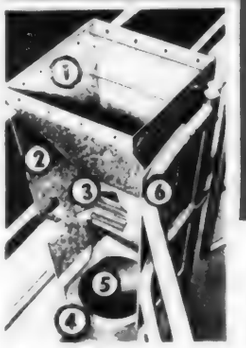

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WHY ROOTS GROW DEEP

(Continued from page 67)

which the plant is growing.

When a farmer speaks of deep rooted crops he thinks first of the legumes. It is true that legumes are usually deep rooted crops, but it's seldom to the credit of the legume alone. When we plant alfalfa, sweet clover, or vetch we usually choose the fertile fields for them. This soil fertility gives the plants a chance to grow deep roots. Alfalfa requires so much plant nutrient material that it is seldom successful on thin soils. If it could get the needed fertility from the top few inches of soil it could be just as successful as when it grows deep roots, and likely in such a case would not grow deep roots at all.

If all of this is true then the farmer should be able to convert a shallow rooted crop into a deep rooted one by building soil fertility to greater depths. This idea occurred to research men at the University of Missouri and they set about studying the rooting habits of sweet clover.

On one silt loam soil the surface portion is shallow and is underlaid by a tightly packed acid clay. Here sweet clover grew, but its roots extended horizontally. When lime was applied at greater depths the sweet clover roots responded by growing deeper. Thus even this crop, famous for its deep roots, grew deep roots only where the soil favored them.

Then, since this is true, farmers have for many years been leaning on a mistaken belief and betting on the wrong horse. It has been the ancient belief that by planting deep rooted crops, the plants would send roots to great depths in the soil, and the decaying roots would enrich the soil. True, roots would enrich the soil. But unless the soil is fertile enough to feed the roots in the first place, there won't be any roots down where the soil fertility is so badly needed.

We need to plow deeper and to get fertilizer at greater depths in the soils that need it. If the nutrient elements are present the roots go down, and upon death they do add the important organic matter. The roots will also bring up minerals from the subsoil, which, deposited in the above ground part of the plant, will enrich the soil when it decays. This gradually rebuilds the soil.

Mechanical Aids Come Soon

The agricultural engineers usually give us a new machine, or attachment as fast as we work out a new principle of land management. Of course, a farmer can use his regular plow to turn under fertilizer spread on top of the soil. He can also use present fertilizer attachments for the plow to put the plant nutrients down at plow sole depths. The subsoiler part of a TNT plow with the spout of the fertilizer attachment coupled to it will put fertilizers down to 10 or 12 inches during plowing. This goes down as streaks 14 or 16 inches apart, according to the size of the plow bottom. Such streaks under test did not show up as streaks in the crop.

Other types of machinery to put fertilizer down at almost any depth, any amount, and any distance apart are now being designed and tested by implement manufacturers. Some of these can be used in pastures, and even on golf courses, with little or no disturbance of the sod. There will likely be no dearth of implements to keep us from building up the soil by plowing fertilizers deeper, and so make crops deeper-rooted by invitation.

Unfortunately, perhaps, roots don't go for a joy ride. They must be invited to greater depths and be lured there by promise of food. Crops are deep rooted where it pays off in plant nutrients.

THE AUTHOR: Dr. William A. Albrecht was born on a central Illinois farm where soils are fertile and crops are big. He grew up with a deep respect for the soil. This interest led him eventually to the University of Illinois where he acquired an impressive list of scientific degrees. Today, as chairman of the Department of Soils at the University of Missouri, Dr. Albrecht is both a tireless worker and a world authority on his favorite subject. Our readers will recall his lime article in the Autumn 1949 issue.

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IOWA (Continued from page 28)

During the summer time the Iowa farmer pastures his hogs on his legume fields. With a four year rotation, which is common in Iowa, the hogs are seldom pastured on the same field more than once every four years.

Hogs have helped many a young Iowa farmer get started. Tom Rees, who at 22, farms in partnership with his father on the home place in Carrol County, is building up his herd of hogs. The four sows he has now are a start.

Tom and Eli, his father, work 360 acres. Eli Rees owns 120 acres of this land which he bought for $12,000 in 1938. Today he figures it is worth $325 an acre. Last year he raised 100 acres of corn, 65 acres of soybeans, which are still not a major crop in Iowa, 65 acres of oats, which is a major crop in Iowa, and 70 acres of red clover and timothy for both pasture and hay. His rotation is corn, beans, corn, oats, and hay. His corn averages about 75 bushels to the acre.

Rees is also the neighborhood agent for one of the large hybrid seed corn companies. Each September he sells about 700 bushels of seed corn, most of it to regular customers. The Iowa farmer has found hybrid seed corn habit forming, and today more than 99 per cent of all Iowa corn is hybrid.

There are four children in the Rees family, ranging from Tom, who is 22, to Jessie, who is 8. Dick is 11, and Ann, a high school freshman in nearby Coon Rapids, is 15. Dick and Jessie attend the one room school a quarter of a mile down the gravel road that passes in front of the farm. The Methodist Church to which the family belongs is a half mile in the other direction. Ann sings in the choir, and Mrs. Rees, who is president of the Ladies Aid, protests mildly that "Eli goes to church on holidays mostly."

Eli Rees, like most Iowa farmers, worries more about politics in his home state than what's happening in Washington or beyond. The Iowa farmer, however, is no longer an isolationist. He takes an interest in world trade and the national debt, which Rees thinks of as "A big bill that we should have been paying as we went along." The Iowa farmer is by tradition a Republican. Only four times since 1857 has Iowa gone Democratic in a national election. This happened once for Wilson, twice for F. D. Roosevelt, and again in 1948, when Iowa helped elect Truman. No politician could doubt that the farm vote swings the state of Iowa.

The Iowa politician can give us a clue on what is closest to the heart of the Iowa farmer. When the Congressman returns from Washington to repair his fences, he lards his speeches with frequent mention of the home, religion, motherhood, and 4-H. Few farm families in the state with children old enough are not represented in their local 4-H chapters. In the Rees family, Ann and Dick are members.

The Iowa farmer is close to war when it comes, for he must increase his production with less help and fewer machines. Tom Rees has already served 18 months in the army, is in the reserves, and feels an understandable uncertainty about the future. Eli doesn't know how close he could come to farming 360 acres alone, but at 45 he is still young enough and healthy enough to try.

The young Iowa farmer commonly starts farming in partnership with his father, or working as a tenant. Tenants usually look forward to owning their own land. But a check up in 1945 showed that, even after several good years, 22 per cent of all Iowa farm operators over 55 years old still did not own land.

Ted Brinks is a tenant who farms 160 acres of hilly land in Audubon County, in southwest Iowa. Brinks, now in his late fifties, says, "I reckon if I had to do it all again, I wouldn't start farming. A man works too many hours for what he gets out of it." Helping Brinks on the farm is his 18 year old son, Norbert, who disagrees with his father on the values of farm life. "Sure, I'm going to farm," he says. "It's healthy work, and besides you can take a day off if you want to go to the State Fair; that is, some times you can. And" he adds, "besides that, everybody around here grows up expecting to farm."

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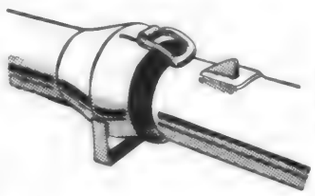

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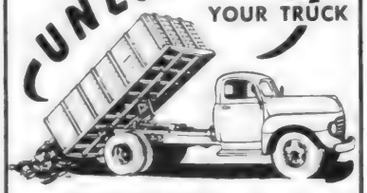

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There Are Changes In Iowa

Iowa land has made its farmers rich. It has also made good business men of them. They are aware of new ideas that are coming along in land use, for proper land use is their key to success.

At the Iowa State College, in Ames, a corps of agricultural economists conduct a continuous study of the changes underway in Iowa farming and farm life. For the most part these trends are so gradual that the average farmer may not be aware of them.

Iowa, for instance, is backing out of dairying. The state has long been a major producer of butterfat. Because vegetable oils are replacing butterfat, peanuts, cotton, and soybeans are replacing cows. Iowa farmers who keep dairy cows would prefer producing whole milk to butterfat, but with few large cities within trucking range, the market for whole milk is limited.

In the 1920's dairying made more money for Iowa farmers than beef production. The picture has changed. Farmers can add 600 pounds of beef to a steer, but 300 pounds of butterfat per year is high production for a dairy cow. A pound of butterfat is not worth twice as much as a pound of beef, and consequently Iowa farmers are growing more beef and keeping fewer milk cows.

The numerous Iowa farmers who still keep their small dairy herds are gradually returning to a dual purpose cow, one that produces both milk and beef type calves. A number of Iowa artifical insemination rings now keep Angus bulls on tap, and farmers breed their poorest cows to them. Nor are dairy farmers still selling veal calves as readily as they once were. They are keeping the bull calves to sell as steers.

The chicken is becoming more important in Iowa Agriculture. There is no indication that Iowa will abandon its farm flock system or that it will ever support large numbers of big time poultrymen, but the size of the farm flock has grown and their numbers have increased since the Second World War.

There is little chance that the poultry flock will ever grow so large in Iowa that the farm wife can't handle it. The farmer has no time for chickens. He must be about his most important work of producing corn and hogs. The wife can increase the total farm income with her small flock of chickens and thus take fuller advantage of the family labor available. The farmer, too, usually considers this a sound idea. As one Iowa farmer said, "The reason the farm wife can make money on her chickens is because her husband gives her all the feed. But he gets fried chicken often, so everybody's happy."

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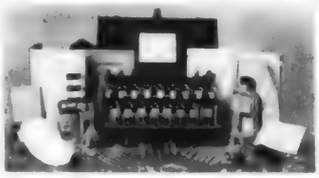

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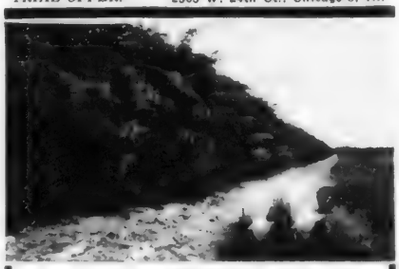

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Hog management practices undergo occasional and gradual changes throughout Iowa. Noticeable now is the trend of the hog farmer toward twice yearly farrowing, and a more even distribution of market hogs to take advantage of the best marketing seasons. Helping the farmer produce his pigs at the right time and raise more of them to maturity are such hog farming refinements as pig brooders, better feeding practices, and an increasing interest in sanitation.

Of all the farm animals that have felt the changes in Iowa farming in recent years, the horse has felt it most severely. Iowa, which is the farm machinery manufacturers most lucrative market, has rapidly shed its work horses. The College of Agriculture at Ames, which like most colleges of agriculture, is reluctant to shed old ideas, no longer requires each student to take a course in horses.

Iowa farmers admit, for the most part, that their farms are now well equipped. In recent years there has been ample money for the purchase of new machines, and since the war the machines have been available. If another war should come tomorrow, Iowa farmers could probably weather the following few years without much additional machinery.

The wealth of the Iowa farmer in machinery is indicative of his general well being. While the occasional Iowa farmer might deny that he is well off today, he would have difficulty talking down the figures that help disprove his statement. He has money in the bank, and if there is less there than he would like to think, it is usually because he has modernized his kitchen, of which he is justly proud, or because he has built a new machine shed, or bought a new car. The Iowa farmer lives well, and this, in the final analysis, is a good index of his actual wealth.

Land prices are high in Iowa, but the economists see little chance that prices will drop below their present level within the foreseeable future. The farmer can afford to buy land at the present high prices and expect to get out from under his debt in reasonable time, and reasonable time for paying off a mortgage today is ten years, not 40 as it was a decade ago. "If a man can't pay off more than half the cost of a farm today in five years," one farmer said, "he's likely a darn poor farmer."

The high land prices have been partly responsible for an increase in tenancy in Iowa in recent years. There are few farms for sale. This is partly due to the fact that the retiring farmer keeps his land, moves to the city, and hires a tenant. Some farmers made more money in the '40s than they expected, and now they can afford to move off the farm and rent it before they would normally have retired.

The supposition that California is populated by retired Iowa farmers who go there to die, is highly questionable. Iowa's county seats and small towns have their share of retired farmers who expect to die in Iowa.

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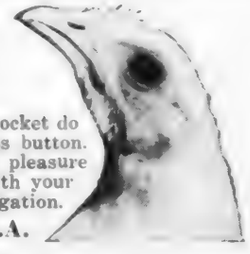

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Legumes May Go

The soil conservationists and the agricultural extension people won't admit it publicly, but Iowa farmers are beginning to realize that their standard system of crop rotation faces a major change. And what is happening will upset a lot of thinking, for some soil scientists now question whether legumes are necessary as a soil building crop. While they will continue to be grown for hay and pasture, the farmer will depend on the fertilizer bag for more and more of his nitrogen where erosion is not a great danger. There is a growing feeling among the scientists, and a few farmers, that much of Iowa's good land can grow grain year after year.

This revolutionary thought is just starting to creep into the thinking and the dismissal of legumes as soil builders will be a slow one, and perhaps not a general trend for several years. One of the state's most successful farmers is already removing the legumes from his crop rotations, and increasing his applications of ammonium nitrate to supply nitrogen for the following corn crop. He pointed to a nitrogen-short field of yellowing corn and said, "That field is short on nitrogen and there was a good clover crop plowed down last year. There should have been 100 pounds to the acre of ammonium nitrate added regardless of the clover. It would be just as well," he added, "not to grow the clover and apply 200 pounds of nitrate for the corn."

Iowa's Schools

Iowa is still the stronghold of the one room country school. On the one hand, the state has the highest literacy rate of any state in the nation, and on the other, it still has 5,651 one room schools, with an average of 11 pupils each. Iowa farm people think they have the best reason in the world for keeping their one room schools: they like them.

The one teacher school is so firmly entrenched that even in villages, such as Dedam, one room handles all the school children. There are not enough pupils to justify hiring another teacher. The seventh and eighth grades are sent by bus to a larger consolidated school because this costs less than hiring another teacher for them. Dedam could also send its younger children to the consolidated school, but the parents prefer to keep their small children in the home town. The teacher, Miss Isabella Schoeppner, who comes from a farm family, lives on a farm five miles from town. "Fifteen of my 24 pupils are in kindergarten," she said, "and that leaves only one or two in each grade from the first through the sixth."

Iowa's professional school people continue to plug for the larger consolidated school, and the farm people continue to fight the trend. Most of the one room schools out in the country at the crossroads will be there for several years. And so will the one in Dedam, population 357, where one oldtimer recalled somewhat sadly, "We used to have a railroad run real close to here."

While sin is no less popular in Iowa than in any other Midwestern state, the rural population sets great store by the old-fashioned virtues—church going, temperance, connubial fidelity, and honesty. The term, "Bible Belt," is not inaccurate when applied to Iowa.

Iowa farmers have little time for what the effete Easterner calls culture. There are no great symphonies, no world famous art galleries, nor do farm wives hold salons in the Continental manner. But there is a deep appreciation of the beauty of a field of corn when it is as high as an elephant's eye. This grass roots culture, some critics claim, is the most honest of all cultures. The Iowan is surprisingly happy, surprisingly shrewd, and gets along amazingly well just as he is.

Iowa farm people are mildly addicted to joining. They belong to numerous organizations in addition to the strong Farm Bureau and 4-H. In this productive state, where few farms contain more than 400 acres, a neighborhood takes in a lot of territory. Iowa farm people know a lot of other people. Even when they journey to the annual state fair in Des Moines, Iowa's largest city, they meet acquaintances all day long. For many this is the

only time during the year that they see relatives and friends from distant parts of the state.

One farmer and his wife teamed up to state the situation with what is probably considerable accuracy. "Why, out here," he said, "people know you for six or eight miles around." "Yes," said his wife, "and all your business."

Her summary was more a statement of fact than a condemnation, for Iowa farm people think they live a good life. They are satisfied to be farmers in Iowa, and out of hearing of their minister, would admit that St. Peter probably never made a wiser decision than when he sent the Iowa applicant back to his home state.

THE DURABLE DUTCH

(Continued from page 86)

Maria ter Maaten's old mother lives with the family. All are as busy as beavers from dawn to bed time. The moment a Dutch housewife sits down she pops a bag of knitting out of her voluminous apron pocket and her fingers fly.

Mynheer Meerveld does well on his 32 acres. The home lacks no comfort. The table groans with substantial vittles and goodies served at afternoon tea are varied and plentiful. But the Meervelds are thrifty. They have no patience with those who spend the hard-earned guilders for luxuries.

"We go to church on Sunday," says Maria ter Maaten Meerveld, "and every summer we go to the Cooperative picnic. That is all. I can't remember when we saw a movie." Indeed it is probable that the Meervelds work 364 days a year.

On his 32 acres Wynand raises enough feed for a herd of 20 black and white milking cows, seven yearling heifers, calves from the 20 cows in season, 3 horses, 6 brood sows and their pigs fattened for market, 400 laying hens, 200 broilers, a goat, a dog, and two cats. This, of course, does not include a minimum of cow and poultry supplement.

He has 14 acres of permanent pasture and six years of hay and pasture in the rotation. He stretches this, from April to November, by rotating grazing. Using an electric fence, his stock graze 150 square feet each day and are then changed. He pastures about 40 head on the 20 acres and feeds only a minimum amount of supplement (which includes chopped beets for his milking cows) during the grazing season.

Hogs get no grass. They are fattened on steamed potatoes, the largest crop on his 14 acres under tillage. The potatoes are custom steamed (at the creamery), buried, and fed as needed. A steamed potato will keep two years or more.

His milk is picked up twice a day by the Cooperative, which also administers

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the regulations regarding bacteria count, T.B. and Bangs. His grade cows average about 1000 pounds of 3.52 per cent milk. He has been a member of an artificial insemination ring for three years. The cost is $3.75 per cow for as many services as necessary. He admits that he has no ambition to own a tractor. "Tractors don't make manure," he says. He would like to own a potato digger, for his biggest outlay is for transient labor when he digs his four acres of potatoes. His few acres of oats or wheat are cut by hand, ricked, and threshed out during the winter, or threshed by combine by custom operator. He fills a trench silo with grass, beet tops and green rye each year. His cattle, hogs, chickens and horses produce 25 tons of manure a year. In addition he uses 20 tons of commercial fertilizer on his 32 acres.

He is subject to no controls. The Dutch market is free, and there are no quotas nor price controls. It's every man for himself, the way the Dutch like it.

His net cash income in 1949 (not including income tax of $210) was $2500, the biggest item of which was his milk check.

PART III

The Tulip Man

When one thinks of Holland one immediately thinks of windmills, wooden shoes, and bulbs. While the windmills are being replaced by electric pumps, the wooden shoes and the tulips are still important. A comparatively small area in a very small country produces the bulk of the fancy tulips, hyacinths, narcissus, crocus, daffodils and iris bulbs of the world. This area is centered around the picture book cities of Haarlem, Leiden, and Lisse.

G. Van Parijs Jr., is a bulb grower. He lives in the west half of a two family house (he owns his own half) in Lisse, the center of the bulb growing district of Holland. He is of French descent and is proud of his name ("of Paris" in English) because his is the only family by that name in Holland.

He is a large, capable man, as much a floriculturist and business man as a farmer. He speaks English well, an accomplishment in which he takes no particular pride, for a bulb grower considers an extra tongue necessary equipment. His three children are well mannered and his pretty wife serves tea with distinction.

He rents seven and a half acres for his bulb operation and employs four men the year 'round, and extra labor, mostly girls, when the bulbs are peeled and sorted.

Bulb growing for a living is no bowl of cherries. It is highly specialized, highly competitive, and takes a lifetime of experience. Van Parijs grows iris, daffodils, tulips and hyacinths. It takes three years for a tulip to reach market size, three to five years for a hyacinth. During that

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time there are many operations of sorting, replanting, peeling and dividing.

There is no machinery except hand tools and a sorter on the place. The seven and a half acres are spaded by hand. Once every four years, after three years of three different kinds of bulbs, a portion is spaded deep and a potato crop planted in the rotation.

The bulbs start flowering near April 1. From then until the third week in May the four laborers are busy stripping the flowers. The blossoms, a fragrant and colorful by-product, are gathered in baskets and dumped on a compost heap. During the annual festival they may be spread over vacant lots or on lawns to make varicolored designs for the amazement of visitors. Some are made into leis to be sold on roadside stands. During the tulip time in Holland cut flowers are on every table.

About the third week in June the bulbs are taken up, stored three weeks in controlled temperatures until dry, and then peeled and sorted. The larger ones are sold, the smaller replanted in October for next year's crop. The bulb fields are mulched with straw during the winter.

All kinds of bulbs are grown on plots 80 ft. x 14 ft. Depending on the type and size, up to 1000 bulbs will grow on a plot. Van Parijs receives from one cent to four cents each for the 400,000 tulip bulbs he produces each year, and two cents to five cents for the 250,000 daffodil bulbs produced. In all he sells about 1,000,000 bulbs of all kinds each year and has a small cash income from potatoes.

Labor is his biggest expense. Bulb field workers receive 42 guilders (about $11.00 American) for a 48-hour week. The laborer receives a sliding scale bonus for each child, six weeks illness at full pay, two weeks vacation, one of which is on full pay, the other on double pay, free potatoes, a garden patch, and a cottage. For old age insurance the employer pays one third, the laborer two thirds. Rents and food are relatively cheap in Holland, but the laborer works longer and harder and gets less, materially, than the American farm worker. He is probably more secure and enjoys more of the amenities.

The science of growing bulbs is an open book in Holland, yet Van Parijs would doubt the practicability of instructing the American housewife how to grow prize tulips in one easy lesson. The flower that sleeps in every bulb, like the fairy princess in the bewitched castle, cannot be awakened to its full beauty and fragrance by a dilettante.

"We send our young men to school for years and then, like myself, they work among bulbs for a lifetime and still have a lot to learn," he says. "We have to have a green thumb," he adds, "and you can't get that out of a book." The Dutch have tried, from time to time, to produce a black tulip for more than three hundred years. They haven't made it yet.

Tulips are planted three inches deep,

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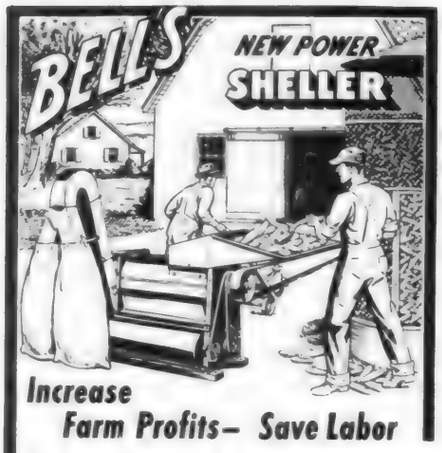

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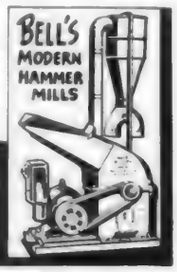

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daffodils and hyacinths 8 inches to 10 inches deep, in sandy loam soil. Van Parijs uses 25 tons of cow manure per acre per year in addition to 900 pounds of 15-18-30 fertilizer per acre per year. When to divide a bulb, when to deflower, when to plant, how much to cultivate, and how to develop new varieties, are items of experience.

The Dutch government keeps a sharp eye on the international bulb situation. Quotas are imposed to prevent a glut or low prices, but there are no controls on selling price. That is set by supply and demand throughout the world; and Holland rules the bulb world.

Fortunately for the Dutch, windmills, wooden shoes and tulips are photogenic and lend themselves well to the decorative arts, but to the Dutch they are highly useful, every-day utilitarian objects. Before the days of steam or electricity the wind was the only power available to do the big job of pumping the water over the sea walls. However decorative a windmill might be, it was designed by practical engineers and was not the work of an artist. The fancy paint job and the extra gingerbread one sees occasionally on a windmill may be art, but they have nothing to do with pumping water.

The wooden shoes of Holland are the most perfect footwear yet designed by man. They are especially well adapted to Holland where one hardly ever takes a step without getting one foot in water. They are not worn because they are cheap, but because they are the best. They are warm in winter, cool in summer, and what is most important, they are waterproof. Contrary to notion, they are easy on the feet—one can wear them all day long and his dogs won't hurt. A Dutchman steps out of them when he enters the house, contributing to domestic tranquility, for the Dutch housewife is the best housekeeper in the world. They have one drawback—one is not as agile, footwise, as with conventional leather shoes, and they are not practical for running a hundred yard dash. But they are regularly worn when riding a bicycle and with no apparent discomfort or handicap. They are economical and durable; a good solid pair of poplar will last a long time.

The Dutch are temperate people, never having developed a taste for the brews of their neighbors, the Germans, although they make excellent beer. They prefer milk or coffee to wine at meals. They do consume generous quantities of gin, or Schiedammer, the national drink, which they take straight in water glasses. However, gin is not regarded by the Dutch as a liquor, but as a body builder. There are no pubs as the American knows them.

The Dutch are kind to old people and children and they obey the traffic laws. This comes from the crowded conditions of all their canals, roads, and streets and public places, since this is the most densely populated country in Europe. The favorite vehicle is the bicycle; millions throng the highways, streets and sidewalks. The

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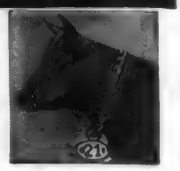

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Dutch have developed a highly complex and artful skill in dodging the bicycle traffic, which reduces the foreigner to a nervous wreck in a short time. They make no automobiles, but will soon have an assembly plant for a British car. They are especially careful about giving old ladies with market baskets the right of way. They never know when the old lady might be the old Queen, who occasionally does her own shopping. This may explain why the Dutch are the best governed people in western Europe. Their rulers have never lost the common touch, and they carry their personal thrift into their government.

The Dutch meet the school book legends about their country with good-natured tolerance. No one knows who first told the yarn about the boy who stuck his thumb in the dike, but it certainly was not a Dutchman. For a long time the Dutch candidly disowned any knowledge of the beautiful legend about the heroic boy, but in the end they tired of explaining to every tourist who visited the country and obligingly erected a statue to honor the rugged hero. It stands today on the public square of Haarlem, a fine figure of a boy who never existed, whose mythical thumb, as prominent as it is, could never have stopped a leak in a dike.

Every schoolbody learns that the Dutch scrub, not only their floors, but the outside of their houses as well. It is even said that some housewives develop webbed feet, an exaggeration no doubt, but they do scrub everything. It is not uncommon for a shop keeper to scrub the sidewalk in front of his place of business, not once but several times a day. Some of the more zealous ones extend the scrubbing area to the middle of the street. A spot is anathema to the Dutch housewife: mud, dust of any kind sends her into a rage. The national emblem might well be a scrub brush rampant on a field of tulips.

It may be assumed that like ourselves, the Dutch farmer, fighting for his land against the sea, never heard of Zarathushtra, a religious teacher who flourished in the seventh century before Christ. But Zarathushtra must have gazed down the centuries at Holland when he described the five places where the earth feels most happy. "Where one of the faithful erects a house, with a priest, with cattle, with a wife, with children, and good herds within . . . wherein afterwards the cattle continue to thrive, virtue to thrive, the fire to thrive, fodder to thrive, the dog to thrive, the wife to thrive, the child to thrive, and every blessing of life to thrive . . . Where one of the faithful sows most corn, grass and fruit, where he waters the ground that is dry, or drains the ground that is too wet . . . Where there is most increase of flocks and herds and where flocks and herds yield the most dung."

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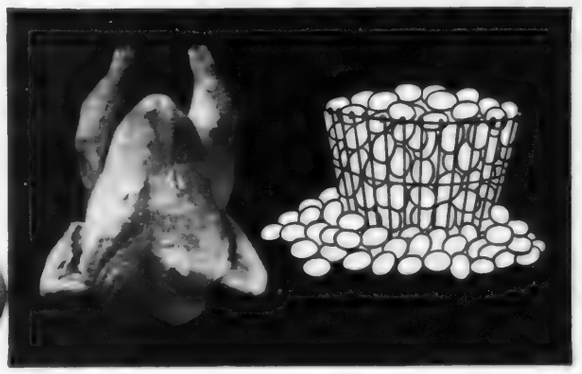

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CHARLIE KIPPEN

(Continued from page 40)

a newly whitewashed fence. It is comfortably furnished and outfitted with the latest model deep freeze, ironer, refrigerator and washers to help Mrs. Kippen and the girls with their work. And with ten children and hired hands to care for there is always plenty of work to be done. Mrs. Kippen herself bakes the day's supply of bread with as little fanfare as most women fry an egg. And when she does the washing she has two machines going at the same time.

The ten children range from Marion, who is 27, to the identical five-year-old twins, Neeta and Leeta. All but three of the ten live at home. Darrel, the second son, is serving a two-year mission for the Mormon Church and the two oldest girls are married to neighboring ranchers. Although Charlie runs the ranch, Mrs. Kippen is top boss around the home. The kids all have their chores to do and all are expected to be obedient—what's more, they are! "Why, if everyone didn't do his part and there was no discipline, we'd surely have a mess around here," snorts Mrs. Kippen. Charlie himself finds raising sheep and a big family go well together. "If your wife gets mad at you," he joshes, "you can just go off to one of your sheep camps for a couple of days, and she's forgot all about it by the time you get back!"

"He wouldn't stay long though," Mrs. Kippen says, "he likes his family too much and is always toting home a pet for the kids. Once it was a fawn for Colleen and this spring it was a colt from a herd of wild horses for Dee to raise and break himself."

As in all ranch life, the male and female world is sharply defined. The girls stay at home with mama and learn to cook, keep house, sew and raise children. The boys have barnyard chores, help with ranching. Charlie has taken them about with him since they were big enough to stick on a saddle. Even 10-year-old Dee rides as much as 25 miles a day with his father on trips to the summer camps. The older boys have all known how to do a man's work since they were in their early teens. Leland, who is going on 15, takes over a herd when Kippen is short of help and camps out alone for a month at a time. His father says he's taught him all he can about sheep; the rest will have to come from experience.

Red-headed Fred, the oldest boy, works with the four hired hands and manages the home place at Morgan. It includes farming 250 acres of alfalfa hay and 150 acres of small grains—40 acres in winter wheat, 50 in spring wheat, 40 in oats, and 25 in barley. These grains are used almost exclusively to fatten feeder lambs that Kippen buys at the stockyards in the fall and later resells as fats.

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usual maintenance work, putting up new buildings, fencing, and taking care of such diverse equipment as tractors and hay bailers, pack outfits and herders wagons. The breeding rams and part of the 20 sheep camp horses are also taken care of on the ranch.

Sundays, Charlie Kippen dedicates to the Lord. In the democratic Mormon Church which employs no clergy, Charlie Kippen, the sheepman, is a Bishop. A sincerely religious man, he is proud of his position as Bishop of his ward where two councilors help him run the meetings, funerals, christenings, Sunday School and relief society, and to plan for barbecues, dances, basketball games, and other social activities. Being a good Mormon, he also gives 10 per cent of his income as tithing to his church. As Bishop, one of the first duties is to listen to the individual troubles of the members of his ward and to help and advise them. Mrs. Kippen often complains, "Charlie's so busy listening to other people's worries that he hasn't time for our own," she says.

Between sheep, ranch, family, and church, Charlie's time is pretty much taken up. But he doesn't believe in all-work-no-play and gets his fun with the local Lion's Club. In the fall after round-up time he organizes a deer hunt and a bunch of the boys take off up the mountain for a week or so. This hunting party makes good fodder for many an evening's reminiscing.

During the summer Charlie visits his sheep camps twice a week—either by truck or pack horse, depending on where they've moved. In dry weather he and the herders scan the sky for clouds and calculate how hard to push the animals to the top of the mountains in search of fresher forage. Rain a week or two late can mean pounds less weight on the lambs in the fall.

As each of Kippen's herds is worth between $30,000 and $50,000 it is extremely important that he hire herders who are dependable and know their business. He pays his men $175 a month with board. Some stay on with him for five or six years before they begin hankering for a change; others stay only a season. His old Basque herder likes to depart with the snows for Arizona or California and work his way back again for spring and summer.

The Shepherd

A quiet, independent lot, herders usually are perennial bachelors and womanshy. But a few of the young ones leave the sheepherding trade to get married, and once in a while an older one returns to get away from his wife. Many of them are inclined to save up their money and then spend it all on a grand spree. One of his more reliable men used to take precautions and have Kippen bank part of his pay so that he'd have something left after a binge. The old Basque is an exception. "He's tightern' the bark on an aspen tree," Charlie says. "Why, he's got money in

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STATE_____

three banks that I know of, and even has his name printed on his checks. And as far as we know he has no living relatives. Every year he says he's going to retire, but he can't bear to spend his money. Just eccentric, I guess. 'Course, I don't care if he never retires: he's one of the best herders I ever did have."

A herder's day is lonely and long. He gets up between four and five every morning of the year to get his herd started. Mid-day between nine and four is the slow time, and it's then the herder tidies up his sun-bonneted wagon home and does his washing and cooking. He usually has a small battery operated radio. Herders are reputed to be the most avid soap-opera fans in the United States. He knows who is keeping company with John's other wife, can tell you whether young widder Brown's beau is suffering from heart trouble, blindness, paralysis, or is up on a murder charge, and, withal, believes that life can be beautiful. Most herders love reading and consume bundles of western stories and detective novels, and a good many entertain themselves with a guitar. Probably a herder's closest companion is his dog. After years of trying all kinds of sheep dogs, Charlie has settled on Border Collies, and each of his herders has one of these intelligent little animals. While he's cooking his own supper the herder usually mixes up a batch of sourdough bread for his dog. This he feeds his pet along with hot cakes, fried potatoes and meat scraps.

Kippen trucks or packs in good grub to his herders at least once a week and their pantry is usually well stocked with potatoes, onions, dried beans, fresh meat, canned milk and coffee, butter, cheese, eggs, a pail of thin bubbling dough for sourdough biscuits, jam and canned vegetables and fruit—which Mrs. Kippen puts up in the summer time at the community cannery. The coffee is a concession to the herder's gentile upbringing since Kippen, as a good Mormon, observes the "Word of Wisdom", the Church food tabu, and doesn't use coffee himself. When it's feasible, Charlie likes to surprise his men with ice cream—a food that is completely approved by both men and church.

On the whole, a herder considers his tiny, horse-drawn, gypsy wagon as much his home as an ordinary man does his bungalow cemented to a city lot. As one oldtime herder seriously remarked to some campers who had pitched their tent nearby, "I bet it's real fun camping out for a change. Why, I don't recall that I been camping for nigh onto 35 years, since I was a boy!"

During the third week in August Kippen and the boys climb into the car and take off for a day at the National Ram Sale in Salt Lake City. Even if he doesn't intend buying any rams, Charlie likes to attend this big event to talk shop with other sheepmen and get an idea of market trends.

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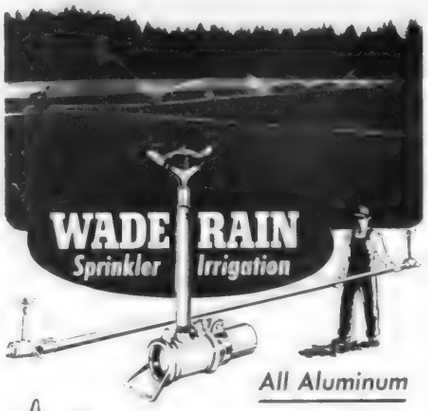

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Market time comes sometime in September and is an especially critical period. Milk lambs right off the ewe must be sold "when in the bloom" to bring top prices. As soon as feed begins to get dry and water becomes scarce, lambs dry out and their meat becomes more like old mutton. Kippen inspects his herds frequently during these weeks, and pays particular attention to their wool. "Soon as their wool begins to stand up stiff like a woman's new permanent, they're slipping", he explains. He is also anxiously watching the market for any indication of a price break. Since he doesn't contract his lambs ahead as some sheep men do, he takes the chance of a fluctuation in the market. So far he feels he's done better than those who contract their stock.

Kippen's lambs are handled on the Ogden market by two commission men who charge him $18 a carload. Their first job is to separate the lambs into lots of "fats" and "feeders". Most of Kippen's weigh around 90 pounds and sell as fats: doubtful lambs are graded by feeling the fat on the last rib and observing how flat or thick the tail is. The fats are ready for market and are shipped out on the first available train; feeders are sold to ranchers, like Charlie himself, who feed them out for later sale. In reckoning the price, the tails make a difference. Kippen's lambs are short docked and the most acceptable. Long-docked "raggeties" attract manure and burrs, are harder to clean, so the price comes down.

Before the ewes are turned back to the mountain for a last month or two of summer pasture, Kippen culls the herd and "mouths out" those with bad teeth that won't do well on the range. These are sold for canning or to middle-west farmers who have easier pastures and want to use them for one or two year breeders. Where a good ewe sells for $30 these are sold for $10.

After the lambs have been sold is a good time for Kippen to do some calculating and see how he's made out. This year lambs are sold for around 24 cents a pound, or an average of $20 a head. Wool is 60c a pound times 9 pounds per ewe times 4,000 ewes. Wages for hired help amount to some $12,000 a year, and expenses, like taxes, leases, equipment, feed, shipping costs, etc., run over $45,000. Charlie reinvests heavily in his ranch and is now building up the herd for his sons so they can start out on their own when the time comes. All in all, Charlie Kippen figures he's done pretty good for a fellow who started out in 1928 by borrowing money for his first 100 sheep.

Varmints

Kippen has had very little trouble as far as sheep diseases go. He has never dipped his sheep because he believes it is too rough a preventative for the danger involved. However, Rocky Mountain Spotted fever is slowly moving into the country and this year he intends to use a new

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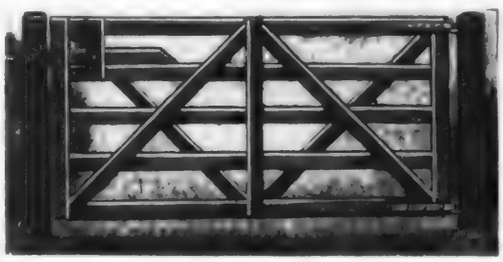

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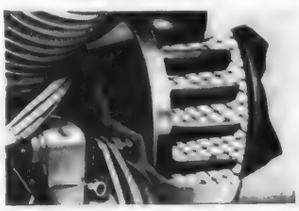

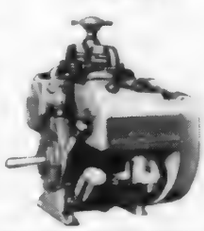

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DDT dust that is easy to administer and is 99 per cent effective. For years Kippen has intended to have himself inoculated against spotted fever, but hasn't got around to it yet. His children, however, have all been inoculated at school through a program sponsored by his own chapter of the Lion's Club.

Oddly enough, Kippen's main worry with ticks is that his sheep might roll over on the ground to scratch their backs. When in heavy wool, it is almost impossible for such a sheep to get rightside up again. Those which have digested their last meal can last quite a while in this uncomfortable position, but a sheep which has just eaten can die very quickly from gases if it is not found and turned topside up.

As short a time ago as the spring of 1949 Kippen lost 70 lambs to coyotes. This year, due to poison-bait put out by the Fish and Game Bureau, the loss was a mere six lambs. Optimists feel that the predatory coyote will soon be eliminated and only a few marauding bobcats will be left.

Even with some of the color and excitement leaving the range, Kippen still finds it plenty exciting to be able to control and improve his herds by using modern methods of sheep raising. He is fencing his leased range at Grantsville and the mountain pastures, is practicing erosion control, and is spending thousands of dollars reseeding the range.

Kippen, however, is interested in more than the pure mechanics of breeding, feeding and marketing his sheep. He loves the outdoors—the sun and sage and cool aspen-groved mountain land. As sure as he can smell the grass growing in the springtime so has he a true instinct for ranching that cannot be learned from books. Though he wholeheartedly approves of all the new-fangled methods that make better sheep, he still thinks a sheepman's ultimate success with his herds is a matter of innate understanding of them.

"Ewes never forget a trail they've been on," he says. "They remember the best feed spots and look for them as soon as they hit a pasture. They get used to their own range, too, and do much better on it than in a strange pasture. And they know when it's time to change ranges. When snowtime is coming they get nervous and restless and want to go to the desert; and when it gets to lambing time they pull in the direction of the railroad station. Why, we once had an old ewe who got in with a strange band of sheep out in the desert, but when lambing time got near she got away, and there she was waiting at the station for the rest of the herd, all set to board the train for Grantsville!

"Sheep just don't do good when they want to leave a range and can't. You gotta know what they're thinking and when they need new feed. And a good sheepman learns to look at his sheep to see if they're content or not. If they're not then he's got to figure out what to do about it. When a fellow doesn't know these things and tries to force his sheep, they're just not going to thrive. Sheep are just like women—they have to be satisfied in order to do good."

All of which might be taken to mean that Charlie Kippen likes sheep. Mrs. Kippen puts it more tartly, "Likes them? Why, he thinks and eats and breathes sheep. Sometimes I don't know why he doesn't turn into one."

THE AUTHOR: Louise Gerdts met her husband Joern Gerdts in Yosemite National Park where she was doing publicity work and he was using his camera in this most photogenic spot. They married and formed a photographer-writer team. From that moment on, Louise writes, nothing could stop them, though starvation slowed them down several times.

THE BRAHMAN CROSSES (Continued from page 35)

the only breed developed in North America officially recognized by the U.S.D.A.

By staying within this one family and using both males and females in it to correct and improve the characteristics of the breed, a steady improvement has been made and is continuing to be made in the Santa Gertrudis breed, which is now fixed.

Perfection is not claimed for the Santa Gertrudis cattle. They are still subject to improvement and the work goes on. There are some 30,000 Santa Gertrudis cattle on the King Ranch and Santa Gertrudis bulls are being used to grade up another 50,000 head which are predominantly British breeds or crosses.

Another of the successful cross breeding projects is the three-way cross between Hereford-Shorthorn-Brahman which has been developed by the Lasater Ranch, Falfurrias, Texas. This is called the Beefmaster. Beefmaster cattle are the result of a continuous breeding program begun in 1908 by that fabulous character, Ed C. Lasater, founder of the town of Falfurrias, and a big man in a big state.

The Lasater Ranch, now managed by Tom Lasater, makes no claim of developing a new breed, being content to produce fine, big, rugged animals with calves that have the ability to make exceptionally rapid gains.

The most ambitious program started recently is that of the Clear Creek Ranch of Frank Buttram and Raymond Pope, at Welch, Oklahoma. Here, on 19,000 acres in Craig County, they are crossing Brahman and Angus to produce what they call Brangus. The foundation herd numbers 1,100 registered Angus cows skimmed from the top of purebred sales and from the famous Canadian Pacific Railways farms at Coaldale and Strathmore, Alberta, Canada. They are using top quality beef-type Brahman bulls on their herd. First cross bulls are being mated back to Angus cows to give one-quarter Brahman and three-quarter Angus. A true Brangus is three-eighths Brahman and five-eighths Angus.

The cross is still in its infancy, but they are producing fine animals inheriting the jet black color of the Angus and having the polled characteristic. They have remarkable size, scale and development. All are noticeably larger than the pure Angus. Brangus bulls are at a premium and are very difficult to obtain. The Brangus breeders now have an association of their own with offices at Vinita, Okla.

Another cross is the Brahman-Hereford, and while no definite attempts to develop a breed from this cross are known, there are a number of breeders successfully raising Brafords, as the cross is known.

At the Cornelius Livestock Company, Coleville, Calif., Paul Cornelius is successfully breeding more than 1,000 head of Hereford range cows to his Mile Hi Brahman bulls each year. This type of cattle is also seen at several points in Texas, El Centro, Calif., and Yuma, Arizona.

Cornelius is using good fundation stock with the result that the cross produces a great growth potential—calves wean at better than 600 pounds at eight months and yearlings weigh more than 950 pounds. Cornelius' Brafords can take 33 degree below zero weather on the range in their stride and make good use of feed in the feedlot. Cases of Braford steers fed out by 4-H club members are reported with dressing percentages as high as 71 per cent. The meat compares favorably with that of the English breeds.

No discussion of the new breeds and crosses would be complete and comprehensive without mention of the Charolais cattle, originally imported from France. The history of the breed in North America is comparatively recent. Late in the 1930's a herd of 40 animals was exported from France to Mexico, and two Texans, Harl Thomas, Raymondville, and Fred W. Turner, Weslaco, were successful in bringing a number into the States.

Thomas is crossing purebred Brahman cows and purebred Charolais bulls to the point where they are producing what is known as the Charbray—one quarter Brahman and three-quarters Charolais.

In Louisiana J. A. Lawton & Sons have a fine herd of Charolais-Brahman crosses which they call Charbra.

The results have astonished cattlemen and officials of the U.S.D.A. As one official puts it, "You can throw away all the rules on animal breeding when you work with the Charolais breed because every possible combination of Charolais blood produces the goods."

This breeding project has been under way for the past 10 years. Thomas makes no wild claims as to what the Charbray bull will do when crossed with other animals, but he gives the buyer a premium of one cent a pound for the calves and buys back the bull at the original price if the buyer is not satisfied with the calf crops. So far Thomas has not refunded any money.

Apparently the rapid growth of the Charolais and the ruggedness of the Brahman combine to produce a beef type animal that is an excellent grazer, a fast breeder and one easy to handle. Grown cows are reported to weigh 1,700 to 2,200 pounds; grown bulls 2,500 to 3,200 pounds. Calves gain 100 pounds a month on grass. The dressing percentage for the cross is 60 to 65. Incidentally, crosses of the Charolais with the English breeds are also producing superior animals. Other crosses, less well known are Brahorns (Brahman - Shorthorn), and Bra - Swiss (Brahman-Brown Swiss).

The Canadian Brahmans

The experience of Western Canadian cattlemen have paralleled that of their neighbors to the south. They, too, have watched the deterioration of their herds and are looking for a remedy.

Thirty years behind the Americans, the western Canada rancher entered the cross breeding experiments through sheer chance.

It began with the famous Calgary Stampede when Guy Weadick brought in some particularly vicious Brahman bulls for the entertainment of the populace. Rather than ship them back to the States after the Stampede was over and import an-

(Continued on page 125)

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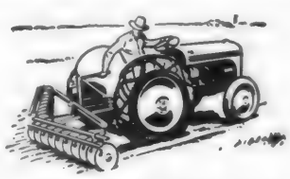

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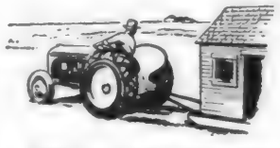

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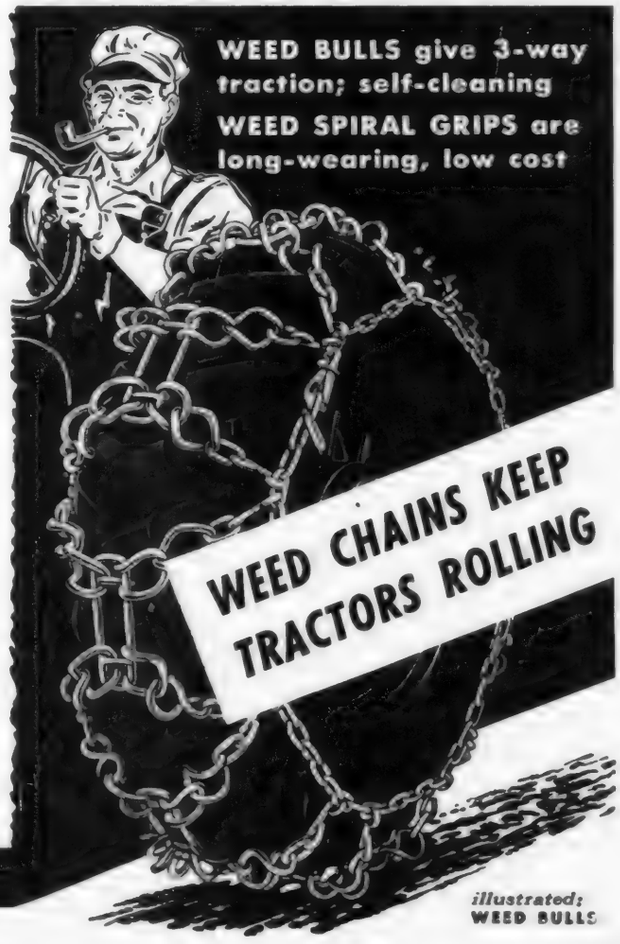
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FARM BOOKS

(Continued from page 16)

In addition to the four sections Wheeler has listed hundreds of additional reference works under the headings of the states to which their subject matter relates. In this way readers are given from a half dozen to 30 or more references to material that has been written about the forage crop problems of their particular area.

Tree Crops, *by J. Russel Smith*
The Devin-Adair Company *$6.00*

J. Russel Smith, with half a century of scientific investigation of trees behind him, has written a book about a group of crops that has been too long neglected. Dr. Smith sees in trees the hope of our eroding hillsides and a source of nutritious food for man and beast.

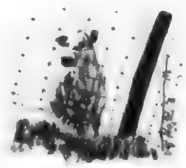
In a style that is rare among scientists, rare because it is easy to read and simple to understand, he has outlined a plan for research into the food possibilities of trees. First, he contends, we should breed into exsistence a whole new array of crop trees. Then we should put these trees to work, each in its proper climate and soil, and each where it will have the most important economic bearing. To accomplish this Dr. Smith believes we need to establish an institute of mountain agriculture, a research station manned by competent tree scientists who, unhampered by political pressure, can find new trees and new work for them.

The tree crops that we harvest today are a small fraction of the potential. Hogs in the South feed on acorns, but, if we had the proper oaks to supply the mast, this practice would be much more widely spread, for six and six-tenths pounds of acorns make one pound of pork. The hulls and beans of the honey locust hold great promise as stock feed and although some research has been done on it, this tree's possibilities have hardly been touched. The nut trees, walnuts (both foreign and domestic) pecans, filberts, chesnuts, hickories, and butternuts, all have food possibilities for they are rich in proteins.

All in all, Dr. Smith has written a book with vision, a volume that is undoubtedly one of the important agricultural books of our times.

The Farm Book Store

The Editors of the Farm Quarterly, after a careful selection of current agricultural books, recommend the following to our readers.



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Colorstrip Plant Testkit.....$4.00
A compact, accurate tissue testing kit that can be carried in the pocket. Tells whether your crops are getting enough nitrogen, potassium and phosphorus to make good growth and produce high yields. "Tissue Testing" on page 60 explains the use of kit and complete instructions come with it.

Forage and Pasture Crops—*by W. A. Wheeler*.....$8.00
A review of this book may be found in the Farm Books column.

Forage Crops—*by Gilbert H. Ahlgren*.....$5.00
A book that emphasizes the production of hay and silage.

Pastures—*by Lancaster, James, Bailey, and Harris*.....$2.96
Southern pastures and how to achieve year round grazing.

Soils and Fertilizers—*by Firman E. Bear*.....$3.75
An understandable book on the complex subject of fertility.

Using and Managing Soils—*by A. F. Gustafson*.....$2.80
Fertility, rotation, drainage, erosion, tillage are covered.

Hunger Signs In Crops—*A Symposium*.....$4.50
How to diagnose fertility needs from the plants themselves.

Elements of Soil Conservation—*by H. H. Bennett*.....$3.20
A discussion of erosion and exhaustion of soils, by an authority.

Production of Field Crops—*by Hutcheson, Wolf & Kipps*....$4.50
A new edition makes this the latest work on American field crops.

Irrigated Soils—*by Thorne and Peterson*.....$5.00
The practice of irrigation and the management of irrigated soils.

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Animal Sanitation and Disease Control—*by R. R. Dykstra*....$3.50
How to recognize and prevent the spread of animal diseases.

Feeds and Feeding (21st ed.)—*by F. B. Morrison*.....$7.00
The authoritative book on livestock and poultry feeding.

Dairy Science (2nd ed.)—*by W. E. Petersen*.....$5.00
A new edition of one of the best and most complete books on dairying.

Sheep Science—*by W. G. Kammlade*.....$5.00
The breeds, care and feeding of sheep for wool and mutton production.

Beef Cattle—*by Roscoe R. Snapp*.....$5.00
A carefully revised edition of this excellent book on beef production.

Poultry Handbook—*by Rudolph Seiden*.....$4.95
An alphabetical reference book of poultry information.

Successful Poultry Management—*by M. A. Jull*.....$3.75
A practical book on poultry from brooding to marketing.

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The Farmer's Handbook—*by John M. White*.....$4.95
Easy reference book on crops, livestock, and farm problems.

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Year round grazing in the south, the easy way to farm.

Law on the Farm—*by H. W. Hannah*.....$4.50
An excellent reference on the law as it applies to farmers.

(Continued from page 123)

other lot the following year, Weadick wintered them out on ranches south of Calgary. Some of the bulls mated with ranch cows and some of the calves attracted very favorable attention.

Then ten years ago, two Alberta ranchers, Pat Burton of Claresholm, and the Streeter brothers of Stavely, brought in some Brahman bulls which they crossed with their own cows. They pushed back their Stetsons and rubbed their eyes when they found that the steers resulting from the cross were outstanding in their ability to winter well and reach significantly greater weights.

The Canadians began to compare notes with their southern neighbors. As a result, there has been a small but steady stream of Brahmans and crosses from the United States to Western Canada ranches, most of them only recently.

To digress, the Canadians have taken advantage of a native product to conduct a highly interesting and unusual experiment. The Canada Experimental Farm Service, the counterpart of the U.S.D.A., is crossing Buffalo with domestic cattle.

The main problem of sterility in the progeny has largely been overcome and animals with only a small percentage of Buffalo blood have demonstrated useful characteristics that enable them to rustle a living under difficult conditions. They have named this cross the Catallo. The Canada Experimental Farm Service believe that these characteristics would be an asset if incorporated in commercial range cattle and there is hope that further breeding will eventually enable these strains to be used for the benefit of the commercial cattle producer. Critics say the bulky forequarters and skimpy hindquarters of the Buffalo will rule him out in a cross.

Brahmans And The Packer

When it comes to grading, most packers slap a dock on any crossbreed that shows any sign of a hump on its withers or bottleness of the hindquarter. But there are also packers who offer a premium for top quality Brahman carcasses which show good breeding and proper degree of finish. This is especially true in the South, where Brahman beef is better known.

Docking of crossbreeds does not bother some producers because they find that the greater weight and higher dressing percentage, where carcass grading is practiced, more than makes up for any docking. Fred Becker, Nebraska, who crosses Hereford cows with Brahman bulls, markets three-year old steers at 1,300 pounds and usually does not take a dock. But if there is docking, he finds he still gains through weight and dressing.

Kleberg is conducting experiments with his Santa Gertrudis cattle far from the home ranch. He has been shipping a

30 years' service from this American Fence

—and the galvanizing is still bright

The Rhoades boys operate a 318-acre potato farm at Greenville, Ohio. Their father put up U·S·S American Fence about 30 years ago and it's still in A-1 condition. Most of the galvanizing remains bright.

Mr. Lawrence Rhoades, Jr. says, "This American is as good as any I've ever seen. It was stiff and tough and could be restretched 24 years after it was originally installed. It didn't rust out and could be bent without breaking after that long service."

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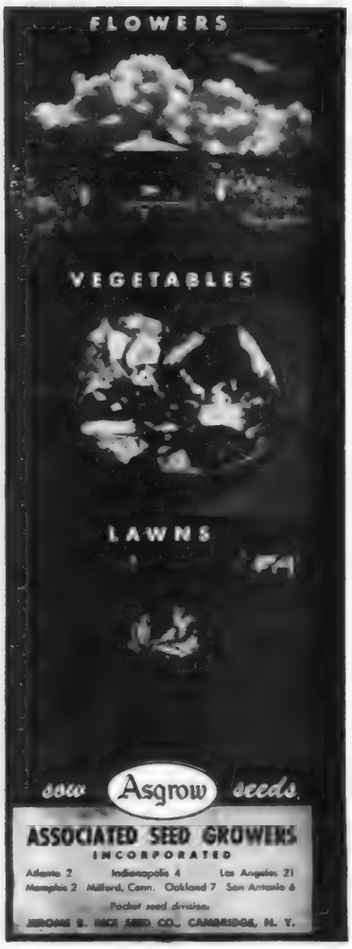

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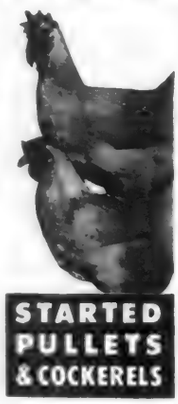

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bunch each spring to Pennsylvania where the cattle are grass fed till mid-summer when they get two to four pounds each daily of cottonseed pellets. They gain about 360 pounds during the grazing season and are then marketed at around 1,300 pounds. Dressing percentage runs around two or three per cent higher than that for the standard breeds.

Whether 1,200 to 1,500 pounds is a little too heavy for market weights does not bother Kleberg because he isn't trying to give the trade what it wants because he makes more money his way.

It is as a grass burner that the Brahman and his crosses show their superiority. No breed can utilize grass quite as efficiently. And their quick growth while still running with the cow has been generally overlooked in the North, although it is well known in the South. A few Brahman bulls are spotted around the Midwest, where they are being used among herds of scrub cows to get a profitable calf for the veal market. These husky calves are left with their cheap mothers throughout the spring and summer, grazing with them until late fall when they top anything the standard breeds can make in such short time from the same grade of parent stock. Ned Hasty, a southern Indiana farmer, bought twenty scrub cows at the Indianapolis stockyards in the late summer of 1948. He bred them to a Brahman bull, and roughed the sixteen that caught through the winter. When the cows calved in the spring they were turned out on pasture with their calves. He sold the calves in late fall at a profit which he estimated 50 per cent higher than he would have made had the cows been bred to an English breed bull.

At the Norris Cattle Co. ranch at Ocala, Fla., a Brahman halfbreed steer sired by a Brahman bull and out of a scrub Florida "Jitney" cow weighed 928 pounds at 14 months. The Norris Cattle Co. has 120,000 acres devoted to Brahman cattle breeding.

The introduction of Brahmans and their crosses has not been without opposition. Their severest critics can see no good whatever in them. Some breed associations have been very blunt in their condemnation of cross breeding. Nevertheless, Brahmans must have something to send them into 43 States and 23 foreign countries. And the number of registrations of Brahmans has increased from 60,000 in 1924 to more than 125,000 today. The American Brahman Breeders Association point to the 71 new members recruited within the last few months, bringing the total membership to 1270.

Cattlemen who have adopted the Brahmans and their crosses have done so because it is profitable. Some ranchers have dropped them because they felt the animals could not stand the cold, a theory which has generally been exploded. But generally, acceptance is becoming the rule.

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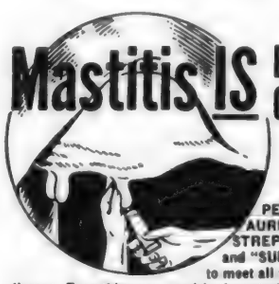

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crossbreeds dress out two to four per cent and even higher than the British beef breeds. Packers are sitting on the corral fence and refuse to enter the argument. They are in the business for all breeds. Privately they admit that with similar finish and condition the crossbreeds have the advantage.

A group of one hundred and sixty-five head of cattle were slaughtered after the Houston Fat Stock Show and Sale. The figures definitely gave the crossbreeds a higher dressing percentage. Fourteen Brahman crossbred calves had a live weight of 12,260 pounds; dressed out at 7,844 pounds for 63.98 per cent. The other 151 calves of other breeds weighed in at 133,182 pounds; dressed out at 82,580 pounds for an even 62 per cent. Shrink was the same for all.

W. G. Bodley, a disciple of the Lasater Beefmasters, finds that his herd at Neosha County, Kansas, makes excellent gains on grass and hold an age-weight advantage over his other cattle by 150 pounds. He did have to spray them for flies, but he did not have to treat them for lump jaw, foot rot, pink eye and a host of other diseases as he did his Herefords.

Tests on half-bred Brahman-Angus calves showed an advantage over pure bred Angus when the former reached 750 pounds 90 days ahead of the Angus calves, and quarter breds reached the same figure 65 days ahead of the pure breds.

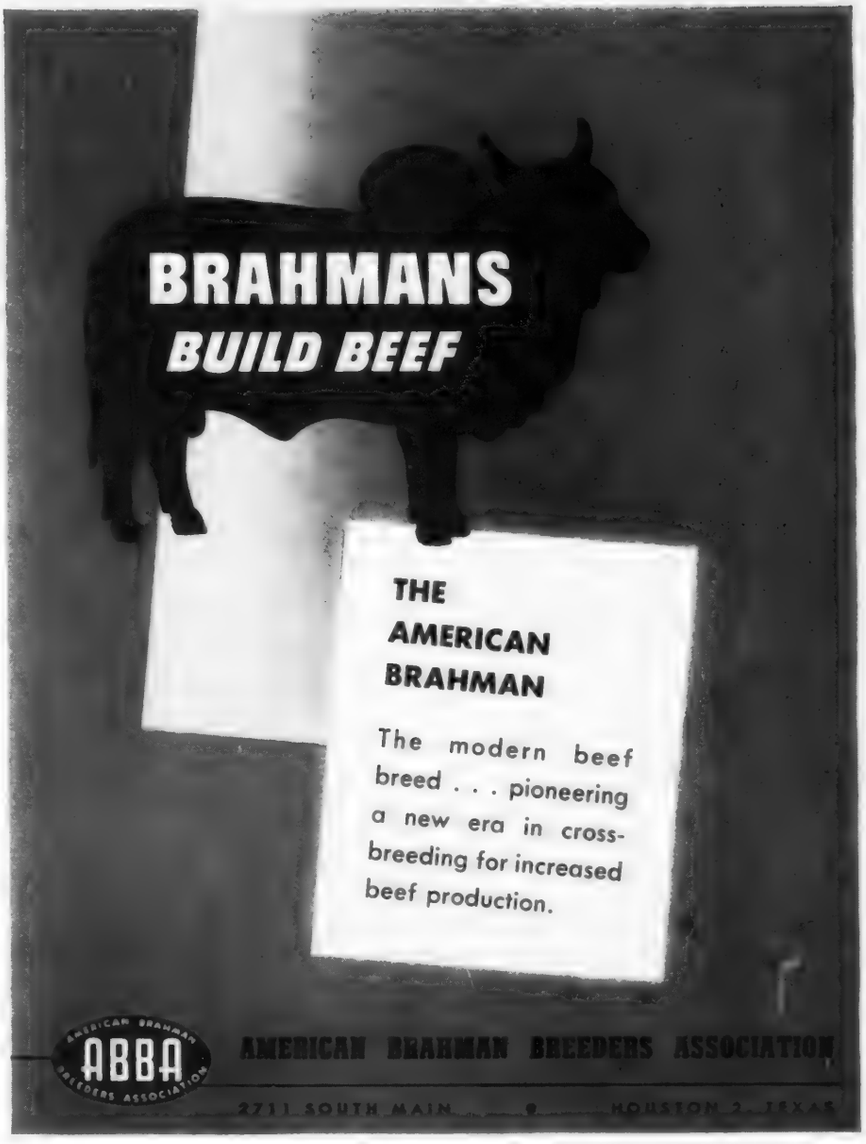
Other tests with Brafords show a consistent weight gain over the purebreds. In a group of eight calves from half-blood Brahman-Hereford cows and a Hereford bull, the average weight at seven months was 413 pounds; 12 months, 518 pounds; 18 months, 737 pounds and at two years, 970 pounds.

While some breeders of the British beef breeds view with alarm the inroads of Brahmans and crossbreeds, others fail to share this view, but see an opportunity to cash in on greater sales of their own breeds. They argue that sound foundation stock of the British breeds will be needed in the cross breeding program.

Possibly the breeders of British cattle have been inclined to rest on their laurels and need a little shaking up. A prominent livestock authority, addressing a meeting of 400 Hereford breeders this past spring at Great Falls, Mont., bluntly asked them if they could match an average weight of 627 pounds for Beefmaster with no supplemental feed.

A lot of those breeders went away from the meeting doing some heavy thinking after being told the Brahmans would bear watching as long as cattlemen sold beef by the pound.

THE AUTHOR: S. A. Goddard, Editor of Imperial Oil Limited's *Imperial Farm News*, has a wide and practical background in farming and stock raising. Born a Canadian, he spent eight years in the U. S. and held various agricultural positions with the Canadian government before entering journalism as farm Editor on Winnipeg and Vancouver papers. *The Farm's* article on Brahman Crosses was adapted from Mr. Goddard's article in a recent *Imperial News*.



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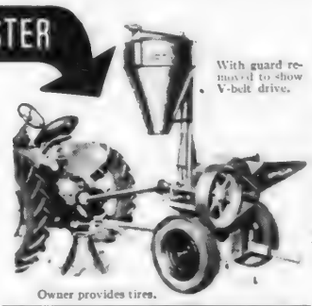
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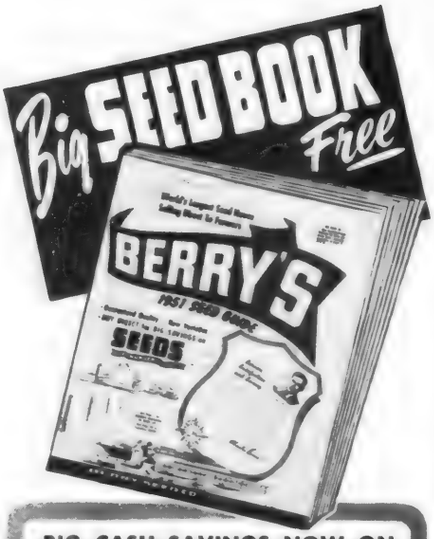

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THE SOUTH'S NEW TOBACCO

(Continued from page 49)

supervised through the season by the county agents and the special tobacco assistants from Duke. But last summer tobacco specialists thought that the crop was ready to go ahead under its own steam. The result has been a big increase in farmers planting it and a proportional rise in acreage. In South Carolina, for instance, in 1949 there were 185 of the closely supervised demonstration plantings in eight counties, while in 1950 there were 1,428 farms in 27 counties planting it under a group supervision plan. Similar reports come from North Carolina and Virginia, and a few successful plantings were made in north Georgia.

There are many types and varieties of aromatic tobaccos grown in Turkey and the Near East. Only two of these are grown successfully here. They are the Samsun, grown in North Carolina and Virginia, and the Smyrna, grown in the northwestern part of South Carolina. The leaf of the Samsun has a bare stem connected to the stalk, is somewhat triangular in shape, and is of light green color. The leaf tissue of the Smyrna variety continues down the mid-rib to the stalk, the leaf is more oblong in shape, and of a darker green color than the Samsun. And the latter has a larger and thinner leaf than the Smyrna.

Aromatic tobacco requires about the same labor as other varieties up to harvest time. It is then, however, that farmers and their families work long hours harvesting and curing the tobacco at the peak of its ripening. When the families' time is totaled at the end of the season each member has earned about 45 cents per hour that he worked on the tobacco. Because of the extra labor required farmers can usually grow less aromatic tobacco than other varieties.

Within the climate where it will prosper aromatic tobacco is best suited to heavy clay soils, well drained, and not too fertile. Many farmers are finding that it does well near the crest of a slope where drainage is never a problem. The soil used for this crop should be one that is inherently good but has been leached of some of its fertility. This enables the farmer to fertilize just enough to make the crop grow up to ripening time. By controlling the amounts of fertilizer he adds he can prevent the tobacco from growing right through the time it should be harvested.

Fertilizer for this tobacco is best supplied mainly by barnyard manure. It should be well rotted and spread at the rate of about 10 tons to the acre. This well rotted manure is about the same as fertile humus, and its fertility is usually exhausted by the time the crop should ripen. In addition, 200 pounds of sulphate of potash should be broadcast and worked into the soil before planting.

The plants of aromatic tobacco, like

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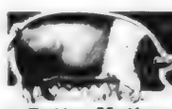

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other varieties, are produced in plant beds. Then they are set to the field much closer than other varieties, in 20 inch rows, and the plants are only four to five inches apart in the row. This is about 60,000 plants per acre. One hoeing and two plowings of just one furrow each to the row constitutes the working that the crop gets since it is harvested so soon after setting in the field. Insects and diseases are the same and are fought in the same manner as with other tobaccos.

The harvest starts 30 to 40 days after the crop is set in the field. The plants are two to three feet high then, buds have just started to form, but no flowers have come. Later the flowers come, for this tobacco is not topped. The harvest starts by picking (called priming) the leaves from the bottom of the stalk as they ripen. This is done at least once a week, taking off from 3 to 6 leaves at a time, until the harvest is complete. The harvest usually lasts from five to six weeks. On most other tobaccos the best leaves come from the bottom of the stalk. But not so with the Turkish varieties. The best leaves of aromatic tobacco come from the top, the leaves that are harvested last.

Experience is required in telling the proper time to harvest the leaves. Usually the leaves ready for harvest will be just starting to lose their brilliant green color. But if they are turning yellow they are over-ripe.

The primers, or people who pick the leaves, collect the ripe leaves in boxes or baskets, taking care to keep them arranged in neat straight stacks. This keeps leaves from becoming tangled and makes the next step in the harvesting process, the job of stringing them, easier. The best time for picking the leaves is early in the morning when the plants are still covered with a mist of dew, and before a hot sun wilts the leaves.

Leaves should be strung the same day they are picked. The basket of waiting leaves should be kept in the shade, for wilted leaves often stick together and might be bruised; tobacco quality is easily lowered by bruising.

Workers who string the leaves sit at tables and gently push a long needle through the spine of one leaf after the other until the needle is filled with 75 or more leaves. The tobacco is then slipped from the needle to a six foot length of twine. After two needlesful, the twine is looped to a stick from which the leaves hang to cure.

The freshly strung tobacco is hung on racks to wilt in a cool shady place for a couple of days. For another six to twelve days the racks are placed in the sun for curing during the daylight hours. To prevent mold the leaves must be quite dry before they are placed in storage. Research men are now at work with artificial heat to improve on this primitive method of curing.

Aromatic tobacco molds easily. If it

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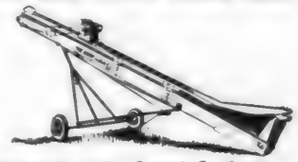

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absorbs much moisture from the air or from moist materials stored near it, the crop will often mold and spoil completely. The farmer needs a dry, weather-proof building for storage between curing and marketing. There should be no fertilizer, hay or other green tobacco stored within the building, for the aromatic varieties will take up some of their moisture. It should also be stored away from barnyard manures since it may take on the manure odor, which is not much sought after in cigarettes.

After the tobacco is sufficiently cured, the strings of leaves are taken off the racks and packed down in piles to "season up" and get in proper condition of moisture for handling. During this time the moisture in the leaves becomes evenly distributed and this helps them take on a soft and velvety conditioning that keeps them from breaking up in handling later. During this time there are also some chemical changes occurring in the tobacco and these, although they are little understood, improve the quality and aroma. Then it is put up in small bales weighing 20 to 25 pounds, and is ready for market.

A market for this leaf has been established at Anderson, S. C. There all tobacco is bought on grade, bringing up to $1.25 a pound. Lower grades are not profitable, and growers are closely supervised to acquire the techniques and ability to produce the better grades which are in demand.

This high acre-value crop furnishes light and profitable work for all members of the family, from grandma to little sister. Many farm families make more off of their one third to a half acre of aromatic tobacco than it does from a full normal crop of cotton on 10 to 20 times as much ground. Small renters and share-croppers have been known to make a substantial down payment on a small farm with one year's proceeds from their patch of aromatic tobacco. Per acre value has run from $700 to $1,200. This is twice the value of flue-cured tobacco and about 10 times the per acre value of an average cotton crop. If he is not afraid of the boll weevil, the grower need not choose between growing aromatic tobacco and cotton; he can grow both! Their peak labor periods come at different times, and the tobacco can be harvested and stored away long before the cotton is ready to pick. The southern farmers fortunate enough to have the conditions for growing it think the future looks brighter now because a tobacco plant that went abroad has returned to become a success.

THE AUTHOR: J. M. Eleazer, who serves as Information Specialist for the South Carolina Agricultural Extension Service, can tell a story so that people want to read it. For twenty-three and a half years, while serving as county agent in Saluda County, S. C. he conducted a county agent's column in the local paper without missing a deadline. Later when he graduated to the state capitol he continued his newspaper writing but offered his columns to papers throughout the state. Today every daily paper in the state carries his weekly column "Seen Along The Roadside." Mr. Eleazer is gathering some of his better columns into book form after numerous requests. This is his first appearance in *The Farm Quarterly*.

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(Continued from page 53)

can do more harm than good. An unexplained pH figure can be as mysterious and awesome as the Latin scribbling on a doctor's prescription. Yet, very often the soil tester makes no effort to give the results of the tests in terms of *how much* lime or fertilizer is required per acre.

A second major fault is committed when a tester does not take into consideration the history of the field being tested. Without knowing the dates and amounts of liming, and fertilizing and crop responses, the tester cannot make an intelligent interpretation of the results of the test. The test might show a fairly high state of acidity, for example, even though it had been fully limed within the past two years. If the tester didn't know of the liming and take into account the fact that it takes varying amounts of time for lime to do its neutralizing work, depending on the fineness of the grind, he might recommend additional lime that would be a waste of money and might actually lower the yields by making the other fertilizer less available to the plants. The same mistake could be made with rock phosphate.

Whether the testing is done by a public or private laboratory or by the farmer with a soil testing kit, there are three main points to keep in mind: First, the soil samples must be carefully taken so that they will represent the condition of the entire field being tested. Second, the tests for acidity, phosphate and potash must be made accurately. Third, and just as important as the other two, the tests must be accurately interpreted in terms of the needs of the soil for lime, phosphate, and potash.

Unless the soil samples are accurately taken in the first place, the chemical tests won't have much value. A few ounces of dirt, after all, are all that are tested to show the needs of several acres.

Clyde Linsley, a soils specialist at the University of Illinois, has found that it takes about 11 samples for a 40 acre field under corn belt conditions. The sample areas should be well spaced over the field, the main point being to make sure that samples are taken from all areas where there might be differences in soil needs.

Each sample should be taken from a rod square sampling area. All of the surface litter should be scraped away from each sampling spot and should not be included in the soil sample. If the field is in row crops, the sample should be taken between the rows and not near heavy root growth or the growing plant itself. In the sampling area, five small samples should be taken by digging down into the top six inches with the hand or a trowel or soil auger. These five samples can be thoroughly mixed together and a handful of of the mixed earth placed in a paper bag to represent the final sample for that point.

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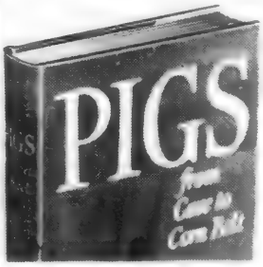

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Each sample sack should be numbered and the sampling point located on the field map.

Once the samples are in the testing laboratory, they are air dried and screened before they are treated with the different chemicals used in making the test. As soon as the samples are dry enough to screen, they can be tested for acidity and phosphorus. The acidity test causes the sample to turn to a color ranging from a light pink to a deep red; the phosphorus sample is changed into different shades of blue. Checking these colors against carefully standardized color tubes of different shades of red and blue gives the results of the tests. The test for potash is much more complex and requires a longer time: the sample to be used in this test must usually be dried for 10 days before testing.

Dr. Rogers Bray worked out the testing process used to determine potash and phosphorus needs. Dr. Bray and his fellow scientists at the University, Dr. F. C. Bauer and Professor A. L. Lang, turned to the long-time records of fertilizer experiments on different soils in the state in developing the procedure for interpreting the chemical tests in terms of quantities of plant food elements needed.

"By studying the records on these fields," Bray points out, "we could determine the rates of application of phosphate and potash which would give the highest crop yields. In a sense, we literally asked the crop to name the application rate which would allow it to produce the most bushels of grain or pounds of forage. Without the long-time records of the fertilizer studies on the soil experiment fields, it would have been difficult if not impossible to establish a system for recommending the amount of fertilizer needed to correct a soil deficiency.

"But this is only a part of the story," Dr. Bray continues. "The one item which most of us believe is responsible for the renewed interest in soil testing is that we found we could interpret the soil test in terms of definite amounts of fertilizer and we could interpret the value of the fertilizer directly in terms of the percentage increase in yield.

"Tell a farmer he needs fertilizer and how much fertilizer he needs and he will only grunt. Tell him that he will get a 10, 15, or 25 per cent increase in yield for an average yearly use of three or four dollars worth of fertilizer and he will open his eyes, do a little mental arithmetic, and place his order for fertilizer."

While some states have adopted similar systems for interpreting the chemical tests, others make no attempt to give the farmer the information he needs on *how much* fertilizer to apply. Since the Illinois system is based on the soils and farming systems of this area, it cannot be exported for use outside of the soil region. Other state institutions will have to build up the basic soil and crop information for their area and then apply the principles of the Illinois

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system.

Dr. Bray has worked out a second type of test which can be used anywhere and will show, indirectly, the chemical deficiencies of the soil. Instead of testing the soil, this test is applied to the living plant to show whether it is drawing the needed elements from the soil. It is one of the few ways that have been devised for testing for nitrogen in the soil. A complete discussion of this test can be found on page 60 of this issue.

There are other soil tests that might be made which only a few laboratories perform. Some of these are the trace minerals tests to determine the availability of such elements as boron, manganese, iron, and zinc which are needed by growing plants. Though these elements are needed only in very small quantities, mere traces, their total absence can be a limiting factor in crop production and in the nutritive value of the crops produced. In some sections of the country there are evidences of deficiencies of these trace elements. Some private testing agencies are prepared to perform the exacting tests for trace elements deficiencies, but only a few public laboratories have tackled this problem as yet.

Making Use of the Test

As one old teacher used to say to his class, "I'm not teaching you this stuff so's you'll die smart: you've got to apply the knowledge." So the findings and recommendations of the soil tester must be put to use to be of value. The $35 Merlin Shike paid for his soil tests would have been money down the drain if he had filed the report away in a drawer or laid it on a shelf to gather dust. Shike, however, is not that kind of a farmer. He started working on steps two and three of the Illinois program—applying lime and fertilizer and growing the legume crop.

Shike started the job of applying the three tons of limestone to the acre called for by the tests as soon as he received his report. He knew that he had to correct the acidity of his soil before he could get a good stand of clover and before he would get the full benefits of his phosphate and potash applications.

Three tons of lime on 167 acres of crop land amounts to around 500 tons. In 1946, when Shike started the program, lime cost $3.50 a ton applied on the land, so his total lime bill amounted to around $1,750—his first investment in the long-range soil fertility program.

Next, he changed some of his field arrangements so that he would have eight fairly even-sized fields averaging about 20 acres each. With these eight fields, he and Walworth, the Farm Advisor, worked out an eight-year rotation on this basis: first year, oats with a legume seeding; second year, legume hay and pasture; third year, legume hay and pasture; fourth year, corn; fifth year, corn; sixth year, oats with sweet clover seeded for green manure:

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seventh year, corn; and eight year, corn.

With his fields rearranged and his rotations worked out, Shike started his program of applying the phosphate and potash fertilizer called for in the soil tests. Here again he followed Walworth's recommendations. Taking a field at a time, he applied rock phosphate on top of the seedbed just before seeding oats and legumes. In this way he could work the phosphate into the soil as he prepared the seedbed for the crops. He phosphated two fields in 1946 following liming, two more in 1949, and two more this year. The last two fields are scheduled to receive phosphate applications in 1951.

By the time he finishes his phosphating program, he will have applied more than 100 tons of rock phosphate at a cost of $23 a ton spread on the land. Over a period of five years he will have made his second investment—this one totaling more than $2,300—in the future of his land.

To take care of the three fields that had a potash deficiency, Shike applied 60 per cent muriate of potash at the rates called for by the tests. It took nearly 7 tons to do the job, and 60 per cent muriate of potash cost him $60 a ton. The total cost of the potash was, therefore, $420—his third investment.

Up to this point, Shike's calculating machine has recorded over $4,450 for lime and fertilizer alone to start his farm on the road toward permanent soil fertility. At first glance that seems like a lot of money to invest in anything. And it is—but farming isn't a first-glance proposition. Investments in fertilizer and soil fertility can't be figured on a one year basis, or even two years or five years. That is why Shike uses a calculator.

In the first place, that total cost of $4,450 should be divided by the 167 acres of crop land. This gives an investment of just a little more than $26 per acre. By applying the full three tons of limestone called for by the tests, Shike has taken care of the lime needs of his land for at least ten years and perhaps longer. Rock phosphate is believed by the Illinois agricultural advisers to be the most economical source of phosphate at the present time. His applications should supply the soil with all its phosphate needs for ten years. He will need to make another application of potash in another four or five years, but that will cost only another $300 to $400.

In short, his investment of $26 per acre actually boils down to an investment of $2.60 to $3.00 per acre per year for the next 10 years and may be depreciated at this rate from his income taxes. At today's prices it wouldn't take an increase of even three bushels per acre in the corn crop to pay for the lime and fertilizer.

But Shike is getting a lot more than just a three bushel increase in corn crop. The one field that yielded 40 bushels an acre when he first moved on the farm came through with a yield of 100 bushels an acre in 1949. Although 1949 was a better corn year than 1937, it wasn't that

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SPOHN'S COMPOUND
FOR COUGHS DUE TO COLDS

much better. It was the fertilizer program, coupled with the cropping plan that puts legumes on the land four years out of eight that has increased the yield to more than double what it was. In other words, for an investment of $2.60 to $3.00 an acre he has increased his corn yield by 60 bushels and his oat yield has gone up 20 bushels to the acre. In any other business, returns of this sort would call for a full scale Senate investigation. But Shike can feel confident that this is only the beginning and he can turn to more than 40 years of research at the University of Illinois to back up his confidence.

The Background For Confidence

Probably the most dramatic and significant of the long time research programs are the studies on the famed Morrow Plots, the oldest soil experiment plots in the United States. They were established more than 75 years ago to study both crop rotations and basic soil treatments. One pair of plots has been kept on corn continuously. A second pair has had a 2-year rotation of corn and oats, and a third pair has had a 3-year rotation of corn, oats, and clover. Here are the average yield figures for the 45-year period 1904-1949:

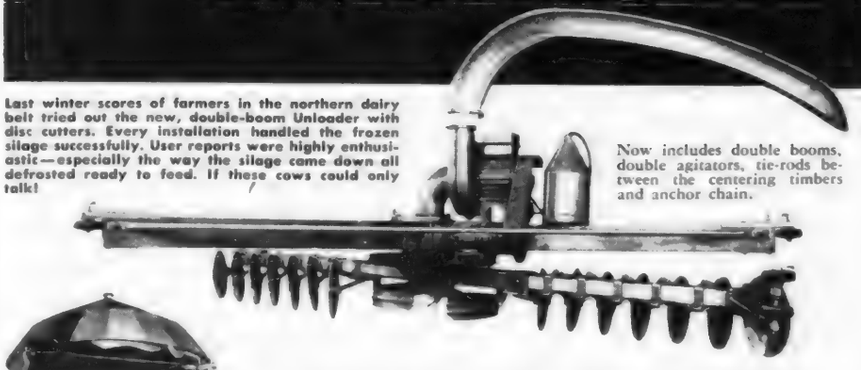
The plot that's been in continuous corn without soil treatment has produced an average corn yield of only 24.4 bushels an acre. The simple rotation of corn and oats increased the average yield a little—to 33.6 bushels. But adding clover to make the 3-year rotation, boosted the average corn yield to 51.1 bushels an acre for the 46 years. That's more than double the yield of the all-corn plot and a 52 per cent increase over the corn, oats, rotation.

The three paired companion plots were treated with manure, lime, and phosphate and held to the same rotation. Yields on the continuous corn plot were 46 bushels an acre compared with the 24.4 when no soil treatment was used. The soil treatment increased yields on the corn, oats rotation from 33.6 to 66.9 bushels an acre. And on the rotation with clover the soil treatment gave the top average yield of 74.4 bushels. In other words, the complete permanent fertility program, which includes soil treatment and the growing of legumes, produced average corn yields that were more than three times higher than when corn was grown continuously without soil treatment.

The figures for the last six years are even more startling than the long term averages. During this period the yield on the all corn plot has averaged 22 bushels an acre, while the yield on the three-year clover rotation with fertilizer treatment has averaged 113 bushels per acre.

These facts and a book full of others from a half a hundred other test plots throughout the state have helped the scientists interpret the soil tests they make. They also give Merlin Shike confidence in his decision to invest in lime and fertilizer. But the results of research show

The New Discs *really work* On Frozen Silage



Last winter scores of farmers in the northern dairy belt tried out the new, double-boom Unloader with disc cutters. Every installation handled the frozen silage successfully. User reports were highly enthusiastic—especially the way the silage came down all defrosted ready to feed. If these cows could only talk!

Now includes double booms, double agitators, tie-rods between the centering timbers and anchor chain.

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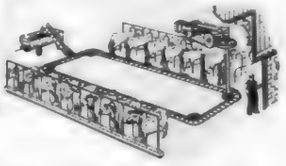

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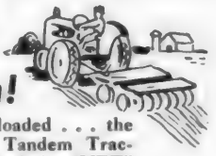

THERE'S A TYPE TO MEET ALL CONDITIONS . . . No matter what you need in a disc harrow, there is a Roderick Lean to save you time and money . . . and to do the job better. There is the "Diskwik" Automatic Tractor Tandem Disc Harrow, acknowledged as today's most outstanding contribution to modern farming—the "Diskmor" wide tractor Single Disc Harrow with one-man detachable gangs—its 15' easily passes through a 12' gate with gangs loaded . . . the "Speedisk" Automatic Tandem Tractor Disc Harrow . . . and the "NFT" Horse drawn Disc Harrow—the finest of its type money can buy. Common to the Roderick Lean Tractor Disc Harrow are the features described below . . . features that speed up soil preparation . . . save you time, labor and money. They protect your initial investment, too, because these harrows are built to last. Ask your dealer about them.

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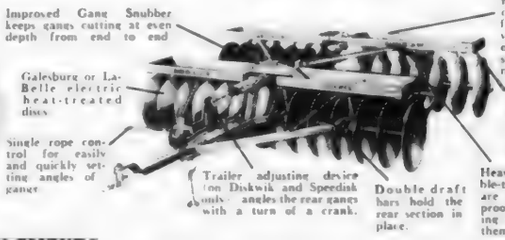
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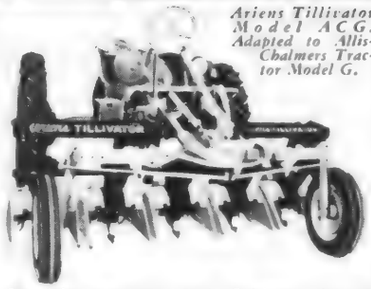
With the ARIENS Tillivator



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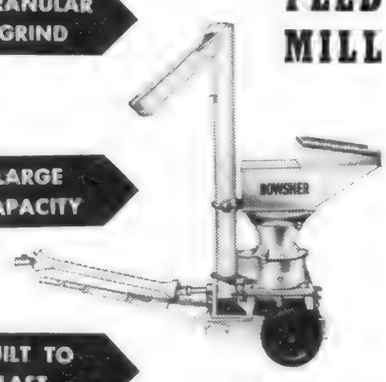

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that lime and fertilizer are not the only factors in a soil building program. One of the keystones of the Illinois system is the legume crop. In fact, it was the continual failure of his clover stands that convinced Shike that he had to make his fertility investments. The reasons are obvious when you consider the total plant food needs of a growing crop such as corn.

Tons of Water

Phosphate, potash, and the calcium and magnesium from limestone are only four of the things corn needs in order to produce maximum yields. Corn needs large amounts of nitrogen, and it is often a lack of this plant food, that holds down yields. Legumes are a cheap source of nitrogen. A four ton crop of alfalfa will return more than 200 pounds of nitrogen to the soil. If this amount of nitrogen were bought as commercial nitrogen fertilizer, it would cost about $24 an acre. That fact alone convinces most farmers of the need for including legumes in any permanent fertility program. But there are other reasons too.

Corn needs water—oceans of it. The scientists, who like to figure such things, have found that for every pound of cribbed corn, a half a ton of water must pass through the corn plant. Roughly, that is 60 gallons for each ear of corn. This tremendous amount of water must come from soil that has the tilth and structure to hold it after rains. Soils that are rich in humus and organic matter can hold the most water. That's where the legumes and the legume-grass combinations come in. Heavy crops of legumes will manufacture from 3 to 5 tons of organic matter an acre. So, the mineral fertilizer is directed to the legume crop instead of the corn crop, for quick results.

Without itemizing the many virtues it is easy to see why the third step of the Illinois system calls for the growing of legumes. The fourth step in the program, the return of manure and crop residues to the soil, is also an obviously good practice. Merlin Shike's farm plan calls for feeding 175 to 200 head of hogs and a beef cow herd of 25 cows with calves. With the livestock on pasture much of the year, the manure is automatically spread on the land. Concrete feeding floors help him save most of the plant food value in the manure dropped in the lots.

Having built up the fertility of his soil at a cost of many thousands of dollars and having made plans to maintain the soil at a high level of fertility, Shike doesn't need a lecture on soil erosion, the fifth step in the program. He has no intention of seeing his work and money wash down a gulley and is taking steps to protect his investment.

Merlin Shike has gone through each step of the Illinois program. His soil was tested, he invested heavily in lime and fertilizer, and he grew heavy crops of

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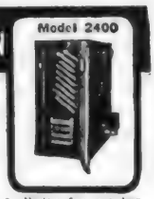

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legumes. The program has begun to pay off handsomely and, Shike confidently believes, will continue to pay off from here on out. Neither he nor the soil scientists at the University of Illinois would say that the Illinois system is the only program to follow. But it would take a powerful lot of facts and figures to convince them that there is a better idea than building the soil fertility to a high point and holding it there.

THE AUTHOR: Hadley Read is that rare person, an agricultural writer who started out to be an agricultural writer. As an undergraduate of Iowa State College he majored in agricultural journalism and later did postgraduate work in the same subject. He has had articles in practically every national farm magazine in the country. He is now Extension Editor for the University of Illinois where he works with the people and on the program he discusses in this article.

BLUE TAG SEED

(Continued from page 57)

the sample be composed of at least 97 per cent pure seed, have no primary noxious weed seeds and not more than 27 common weed seeds to the pound, and a maximum of five seeds of other crops to the pound. Another sample of seed is placed between wet blotters and allowed to germinate in the cool germination cabinet; at least 80 per cent of this sample must germinate to pass as certified.

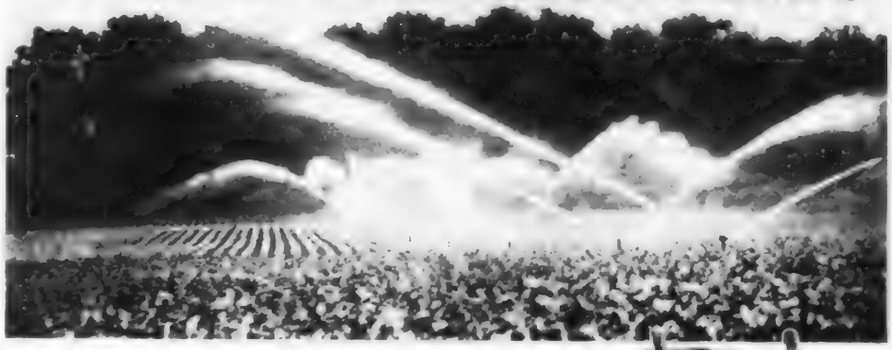
When these tests had been completed, the Iowa Crop Improvement Association issued Morley enough blue certified seed cards to tag his bags of seed oats. Printed on the tag were the results of the laboratory test: Germination 98.00%, Pure Seed 99.62%, Crop Seed 00.10%, Inert 00.28%, Weed Seed 00.00%. Also printed on the tag was the variety, the name of the grower, and the word *"Certified"*. Iowa law prevents any unauthorized person from using the word *"Certified"* on a seed tag or even using a blue colored tag to identify uncertified seed.

With his crop certified, Morley was ready to market his seed. There was a price ceiling on the crop of $1 above the November 1 price on cash grain oats in Chicago, but, because of the publicity that had been given Shelby, he probably will not get less than the ceiling for the crop when he sells it this spring. At this price he can afford the extra work in producing the seed, the cost of certification, and the cost of using new bags—the profit will not be fabulous, but, as he puts it, "It's better than a kick in the teeth." Many of the buyers of Morley's seed will use it for foundation stock for more certified Shelby, which makes it unnecessary to impose a price ceiling on the second year crop. The cost *could* go higher than the first year, but with the greater supply it is likely to begin its drop to around 35 to 40 percent more than the commercial price for the grain, which is the price of most certified seed.

The other small grains raised in Iowa have requirements for certification that are similar to those for oats. In other states the requirements may vary a little to fit

Modern

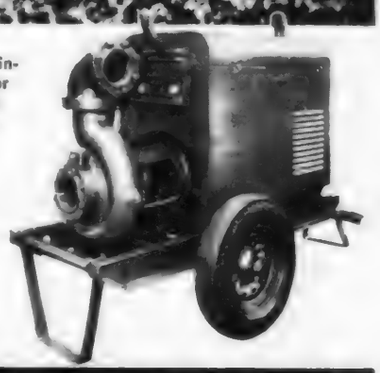
MARLOW IRRIGATION PUMPS



These pumps embody the latest features for modern sprinkler irrigation. Marlows are new—designed especially for today's new pressure and capacity requirements. They will supply water dependably and are thrifty and virtually maintenance-free in operation. Equipped with engines that have the latest safety features.

Marlow Centrifugal Irrigation Pumps are available in 12 models, sizes 2- to 6-inch, including two models designed specifically for the new 2- and 3-acre sprinklers. Capacities 50 to 1500 GPM; pressures 30 to 200 PSI. Gasoline and Diesel engine driven. Skid mounted or with steel wheels or rubber tires.

Write for irrigation facts and full information.



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different situations, but all states that certify seed inspect the crops rigorously and print the results of the inspection on the tag. With other crops the inspections will be designed to fit the crop. With alfalfa, for example, most states require seedling inspection the first year as well as the regular inspection the year the plants come into production. The inspections for certifying hybrid corn, on the other hand, have to do with the apparent purity or uniformity of the two parents, the thoroughness of the detasseling job on the female plants, and the isolation of the field from other corn that might pollinate the seed. No matter what the crop or which the state in which it is to be certified, inspections wil be designed to achieve one result: clean seed of a known, recommended variety and a high rate of germination.

The Trade Name

Certified seed is available for most field and forage crops. Garden seed is a different matter. Since this seed is distributed by a relatively few seed companies, the situation is such that the distributor must stand behind the seed he sells. The different garden seed companies have spent a great deal of money advertising their product and building the good name of the company and prefer to trade on the faith the buyer has in their company rather than on an outside agency. It is possible for them to take this position since they exercise real control over the growers of the seed they sell.

Early in the history of hybrid seed corn production, most of the large seed corn companies, as well as the smaller ones, had their corn certified. Following this, for a few years during the rapid expansion of hybrid corn, there was a tendency on the part of the large companies to forego certification. More recently this situation has changed again, and the major companies are availing themselves of the certification service. In Illinois, for example, three of the large companies are now applying for, and having their seed corn inspected and certified by the Illinois Crop Improvement Association.

Forage crops seeds generally present a different certification problem, requiring co-operation between the different Crop Improvement Associations. The great seed consuming area of the United States is east of the Mississippi river. Forage seed production, and especially that of the small seeded legumes, such as ladino, alfalfa, the clovers, and some of the leguminous cover crops of the southeast, can be increased much more rapidly in the inter-mountain states of Idaho, Utah, Montana, Colorado, and Wyoming, or in the states of Washington, Oregon, California, Arizona, and New Mexico. Breeders seed or Foundation seed of varieties approved in these eastern consuming states, is sent to the seed producing states where it is increased under certification

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INOCULATION for all your LEGUMES
The LEGUME-AID package is appreciably larger than others in size and contains more of the bacteria-carrying humus. This extra amount of inoculant makes it easier to treat your seeds more thoroughly at planting time.

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for a limited number of generations. This seed destined for use in the East, may be labeled with the certified seed tag of the producing state, or it may be labeled with an interstate certification tag, showing the producing state as well as the state in which the seed is processed to meet the standards for certified seed.

The Certifying Agency

The organization that handles the certifying work is usually a non-profit association of farmers and seed men in the state, though it may be a branch of the state government. Where the association is separate from the state government, the state Secretary of Agriculture designates the association to act for his department in the matter of certifying seed; this gives the association legal status.

As a rule the association works very closely with the agricultural college; often the executive officer of the association is connected with the college and the association has its office at the college. Typical of this close association is the Idaho Crop Improvement Association Inc., which has the professor of agronomy of the University of Idaho as a permanent member of the board of directors of the

organization, the other five members being elected by the membership.

In addition to the actual job of inspection and certification, the organization carries on a job of educating the growers of certified seed and promoting the use of certified seed throughout the state. Booklets are printed and distributed by the association listing the crop varieties that are recommended for the state and giving the names and addresses of the farmers who grow certified seed.

Slightly Certified Seed

In spite of the promotion work done by the Crop Improvement Associations, most farmers do not plant certified seed. Even so, the associations can feel that they have up-graded the seed of the state as surely as the introduction of pure bred bulls into a herd of scrub cattle will improve the herd. Though the new varieties that are released from time to time may become mixed on the average farm, the Experiment Stations attempt to maintain a supply of breeders seed which can be increased, and pure foundation seed thus pumped out to the producers of certified seed, so that every farmer can get pure seed whenever he wants it.

Wayne Hagen, of Coon Rapids, Iowa, has profited from the work done by the Iowa Crop Improvement Association without actually buying certified seed. Hagen bought his original Clinton oats seed from Vivian Bell three years ago and has been planting his own seed. Bell's oats were not certified, but Hagen knew that Viv Bell had originally planted certified seed and that his fields were free from weeds. Where Bell had paid $1.75 a bushel for the certified seed the year before, he was willing to sell seed himself for $1.40 a bushel and not go to the bother of certifying.

"Now my Clinton oats have run out on me," Hagen says, "and I think I'll try another variety. Clinton was wonderful the first year, but now we have a new type of rust that gets them, and my crop was quite poor this year. Next year I think I'll plant Cherokee. I've heard that it isn't so susceptible to rust. My neighbor, Dick Wood, planted some certified Cherokee last year, and I can get my seed from him."

Commenting on this method of obtaining seed, one of the officials of a crop improvement association said, "Of course good seed can be obtained in this way—all good seed is not certified, but all certified seed is good. And that's just the point. When you're investing your time, labor, fertilizer, machinery, and land in a crop, it seems to me to be false economy to cut corners on seed. It may work well for some farmers to buy seed from their neighbors if they know that the neighbor's fields are weed free, but I've known men to plant themselves a crop of noxious weeds that took them ten years to root out. Our selling point with certified seed is simple: the variety is adapted to the area and has been tested for growing in the climate and under the disease conditions in the area: the seed is as true to the variety as it is humanly possibly to grow it: and the seed is free from weed and other crop seeds. You pay more for it—and it's worth every penny you pay."

THE CASE FOR STARLINGS

(Continued from page 47)

Suppose, just for the sake of a number, a number used by one mathematician, that a single starling in 1925 had eaten 1,000 Japanese beetle grubs. By 1949, this mathematician figured, those beetle grubs could actually have produced 21,000,000,000 ravenously hungry Japanese beetles descendants.

The weapon with which the starling destroys Japanese beetle grubs is his long pointed bill. No other ground feeding bird to be found in the northeastern part of the United States is so well equipped to dig beetle grubs from their subterranean lairs. Grackles, crows, blue jays, and even English sparrows are fond of Japanese beetles, too, but they are unable to reach quite so far into the earth with their

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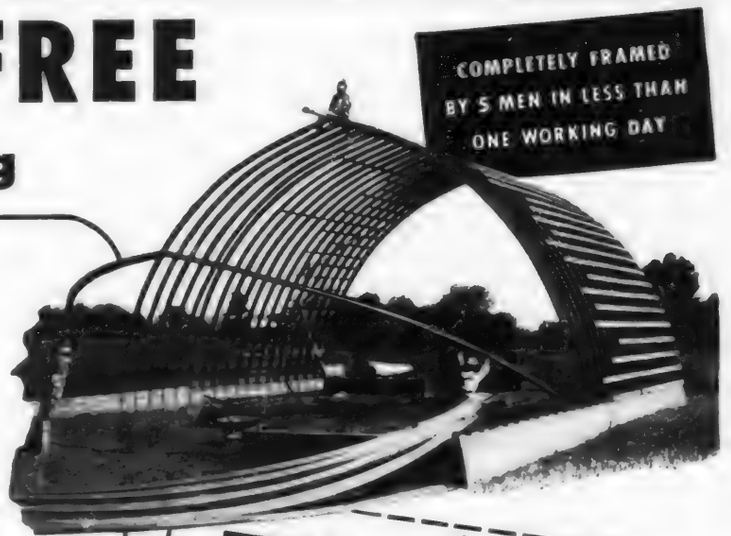

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stubbier bills as the better tooled starling. So the starling is America's number one beetle eater.

In the middle 1930's, flushed with his success over the Japanese beetles, and augmented by a spiralling population, the starling actually tried to take over the White House. During the cooler months for several years, squads of sharp shooters armed with air rifles were stationed about the grounds. At length, like others who have tried and failed, the starlings gave up their try at the White House and settled down in other government buildings along Pennsylvania Avenue.

Starlings and Peddlers

More than one editorial writer with scant knowledge of birds has pointed out the similarity between starlings and door-to-door peddlers. Dawn finds the starling frisking the kinks out of his wings under the eaves of the same hotel in which the traveling salesman puts up for the night. Like the salesman, the starling scurries around town for a quick snack of breakfast and may actually fill his crop behind a diner with scraps from the "drummer's" early plate. Then, forming a winged escort ten thousand strong, starlings head for green pastures on the same farms where the salesman will peddle his wares.

As evening approaches, and the peddler's pouches bulge with signed order blanks, his starling companion will stuff the last beetle grub or the last ox heart cherry into his crammed craw. Then, flying wing-tip to wing-tip, the starling armada forms a swifty moving cloud which casts its shadow on the salesmen as they battle their way, bumper to bumper, back to town.

Evening finds these two inseparables with only a few inches of plaster and lathe between them. The starling is protesting the lusty snores of the peddler who curses squealing starlings in his sleep. It is little wonder that starlings have been labelled, "The Spirits of Deserted Peddlers."

The female starling isn't too unlike her human counterpart either. Each day as she flaps her feathered fuselage from cityside to countryside, her beady little eyes search out just the right place. There's where she plans to build her nest, and there, like most females, she hopes to find a mate to build it. An old outbuilding, a brand new bird house, or a hole in a rotting apple tree will serve her needs.

Housing shortages are old stuff to starlings too. When starlings pull up in front of that swanky new bird house, a martin or a bluebird may have arrived first. Then begins the one-sided battle in which the cleverness of the starlings invariably proves decisive. One by one, America's bird-immigrants are kicking out America's feathered sons and daughters whose blue blood goes way back. One by one, every bird house, every post hole, and every cavity in decrepit apple trees in eastern North America is becoming a starling

1

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housing unit. Even the husky flicker makes way for the starling.

Harried municipalities, suffering from repeated starling attacks, often counter attack in an effort to discourage the birds from roosting on city buildings and flying over nervous pedestrians. Some cities have tried artificial owls made of aluminum and perched them on the tallest buildings where the starlings usually sleep. The owls discouraged the starlings only briefly and soon they were roosting all around the phony predator.

I have often been asked, "What in the world do all those starlings find to eat?" My answer has always been, "A starling will eat just about anything that you will and vice versa." They enjoy a cinnamon bun, an ice cream cone, a ham sandwich, or a rosy red apple. And what about the bugs? We eat them too. I'll never forget the cactus maggots I saw two American women eating unknowingly in a be-spangled Mexican hotel.

Like their human benefactors, starlings will grab the big piece if they have a chance. I recall watching two greedy starlings while they gulped down some toothsome morsels from an uncovered garbage can. When I was only a few feet away, the bigger starling, in a last desperate try to retain the large helping for himself, swallowed what must have been three cubic inches of stale bread in one Gargantuan gulp. A minute later he died in my hand, gasping and choking over his monstrous morsel.

In spring the starling becomes a home maker, the flocks split into pairs, and before the summer is over each pair has usually raised two broods of young. The eggs, which number from three to six in a clutch, are pale blue. The incubation period is 12 days.

As the young leave the family circle they join other young starlings until by autumn huge flocks of the chattering black birds are seen in city and country alike in some localities. Starlings migrate southward during the winter months and other starlings from farther north come in to take their place until spring.

Starling Talk

Can anyone deny that starlings talk? One Canadian lady has trained a starling to speak more than 20 words. This bird is reported to actually speak in sentences. Even your next door neighbor may tell you that starlings talk in their sleep. Listen to some puffed out starling cock as he quarrels with his lady over a domestic issue. He gurgles, he chants, and he squeaks. He clucks and he wheezes. Finally, like any hen-pecked husband, he patches matters up by going into an affectionate huddle with his nagging mate. But to hear starlings chatter at their best, listen to that excited throng as it gathers for the evening on some filthy ledge overlooking a concrete canyon in the heart of some great American city. Can you notice any resemblance to a church congregation a minute

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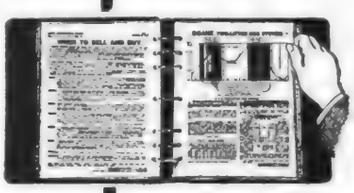

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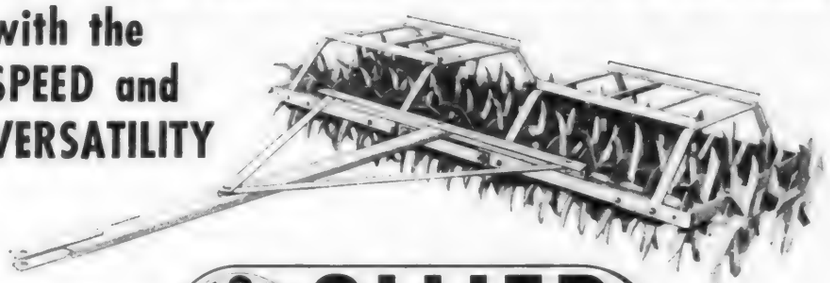

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after the minister breathes, "Amen"?

Like other hard-working immigrants the starling has made himself a place under the Stars and Stripes. Like human immigrants he has displaced native born Americans. "This is a man's world," one great industrialist told me when I called his attention to the plight of American birds, to polluted streams, drained marshes, vanishing hedgerows, and pillaged forests. And, in a man's world, only birds that are "almost human" can survive. Few Americans are happy about exchanging their song sparrows for English sparrows, their mourning doves for vagrant pigeons, or their bluebirds for starlings.

Already the starling population in the New World has surpassed by many times the 7,000,000 starlings in the British Isles from whence Schieffelin's starlings came. No bird expert will hazard a public guess at the total number of starlings now living and breeding in the United States. Some ornithologists insist, however, that the starling tide is being checked by natural circumstances, and one observer points out that in New England there is only a fraction of the starlings that once lived there. So it would appear, that starlings, like humans, have their troubles, too.

Starlings are almost human, they're good, and they're bad. They are heroic when they gobble up our beetles, our weevils, and our grasshoppers. They are pests when they dirty the wash, evict our bluebirds, and turn the new City Hall into a noisome roosting place. But starlings are better than beetles. So we'll have starlings forever.

Probably, the starling does more harm to the American farmer by displacing our valuable native birds than in any other way. By evicting our bluebirds, martins, tree swallows, nuthatches, and woodpeckers from their nesting holes, the starling has already been responsible for seriously limiting the number of these valuable American species. In addition, a large flock of starlings can in the space of few days consume the natural food of many wintering birds, thus depriving worthwhile winter residents of their winter forage.

The future value of the starling armies must be considered from the viewpoint of potential service and not on a day by day basis. No man can foresee the possible insect invasions of the future. Just what day the next beetle or the next weevil will arrive no entomologist can foretell. But the starlings are ready. For the starling armies are mobilized near our great eastern ports. This, then, may be the real value of starlings, a value which farmers should respect, a value for which they should be glad to exchange a few apples, a few grapes, and roosting space in an unused outbuilding.

THE AUTHOR: Dr. Paul H. Fluck is a federally licensed bird bander working under the U. S. Fish and Wildlife Service. When not busy with his large medical practice Dr. Fluck travels around the countryside studying birds. He is, at present, doing some original research on the behavior of the starling. Within the next year he expects to complete a book on the life and times of this controversial blackbird. He still finds time to write numerous wildlife articles for a variety of national magazines. This is his first for *The Farm Quarterly*.

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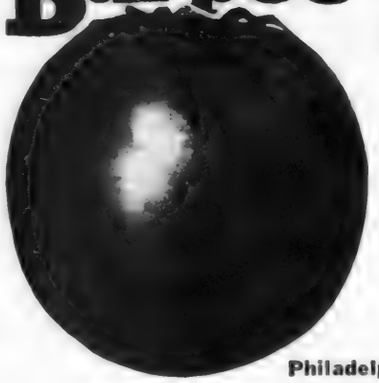

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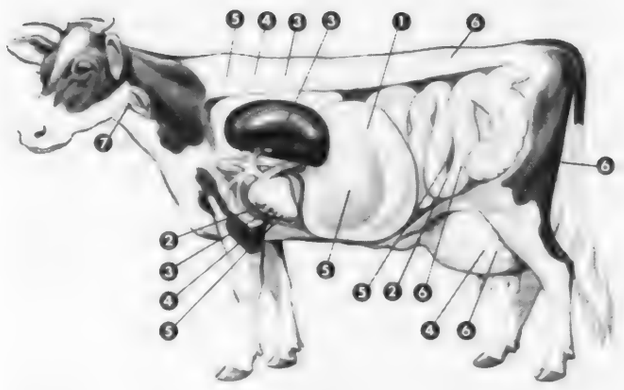


Is HIDDEN HUNGER cutting your livestock profits?

Prevent it this easy, economical way with Morton's Trace Mineralized Salt

OFTEN livestock are hungry, with the kind of hunger no amount of feed will satisfy. They hunger for salt and trace minerals—iron, copper, cobalt, manganese, and iodine.

These trace minerals are needed for efficient digestion and assimilation. They are needed for the enzyme, vitamin, and hormone functions of the body, the basic life activities, that convert feed nutrients into blood, bone, muscle, tissue, and milk.

It costs only a few cents more per animal per year to feed Morton's Trace Mineralized Salt. Your livestock will reward you in faster gains, lower feeding costs. Ask for Morton's Trace Mineralized Salt by name.

1. **CHLORINE** (from salt) is the active ingredient of hydrochloric acid needed to put proteins into digestible form.
2. **SODIUM** (from salt) helps in the digestion of fats and carbohydrates. Controls internal body pressures. Tones up the heart muscle.
3. **IRON.** Needed to make the red blood cells in the bone marrow that carry oxygen to the body cells, and to promote a healthy active liver.
4. **COPPER.** Works with iron in the formation of hemoglobin or red blood cells in the bone marrow. Lack of copper can cause breeding failures.
5. **COBALT.** Stimulates the bone marrow where blood is made. Stimulates feed assimilation in the intestines.
6. **MANGANESE.** Needed for reproduction, big milk flow, and sound bone growth. Also needed for healthy condition in the intestines.
7. **IODINE.** Makes thyroxine in thyroid gland which controls the entire activity of animal body.

Trace Minerals help dairy cows give more milk. Breeding is easier and more certain. Calves are stronger. Trace minerals likewise help beef animals make faster gains. There is better use of feed nutrients. Gains are more economical.

Trace Minerals help hogs to farrow bigger litters . . . cut losses of suckling pigs. Growing pigs make faster gains. Trace minerals also help sheep give more wool. Fleece are heavier, more profitable. Ewes have less difficulty lambing.

Make This Simple Test . . .

Next to your regular salt supply, put a few pounds of Morton's Trace Mineralized Salt. You'll be surprised how your animals relish the trace mineralized salt, showing their need for the iron, copper, cobalt, manganese, and iodine it contains.

MORTON'S
Free Choice
TRACE MINERALIZED SALT
For Healthier, Thriftier Livestock

Send for Free Booklet and Folders

Get all the facts on feeding Trace Mineralized Salt. Write for important literature on feeding salt and trace minerals. Mailed FREE. Morton Salt Company, P. O. Box 781, Chicago 90, Illinois.

Now! COMPOST by MACHINE
Right In Your Garden Itself!

THIS SPRING! NEXT SUMMER! ALL SEASON LONG!

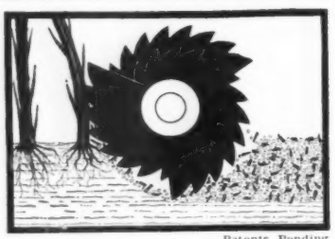
No more hauling, turning and watering of compost heaps! With this revolutionary new garden tractor you do your composting BY MACHINE, RIGHT IN YOUR GARDEN SOIL ITSELF!

The amazing new ROTO-MILLER attachment chops and mixes into your garden soil cover crops, mulch materials, manure, leaves, green, tender weeds, plant and animal wastes of all kinds! This is a new, easy way to work large amounts of rich organic material into your soil. Think what this means in labor saved, soil improvement, bountiful crops!

POWER COMPOSTING 18" BUCKWHEAT

The Amazing ROTO-ETTE
So LOW in price almost ANYONE can afford it!

NEW . . . REVOLUTIONARY . . . WONDERFULLY SIMPLE! . . . THE ROTO-MILLER!



Patents Pending

Here's the new Roto-miller — a rotary cam chopper that makes composting in your own garden by machine practical for the first time! The Roto-miller is shockless—unbreakable! Reduces tangling to a minimum. It takes the place of tines, springs, shock absorbers, slipping clutches, cushions . . . and it does a better job!

COMPOSTING BY MACHINE

Right in your garden itself! No more hauling, turning and watering of compost heaps! With this amazing new machine, you can easily chop and mix into your garden soil: cover crops, mulches, manure, leaves, weeds, plant wastes of any kind — even cornstalks! Think what this means in labor saved, soil improvement, bountiful crops!

Here is the most important and wonderful news for gardeners we have ever had the privilege to announce!

After nearly 20 years of experiment and research, we have perfected a revolutionary new machine, called the Model-T ROTO-ETTE that makes possible a new method of soil preparation and which we believe is destined to make gardening history.

Not only will this amazing machine prepare your garden for planting in one simple operation!

Not only will it cultivate your garden better than any garden machine we have ever seen!

Not only will it mow your lawn beautifully—and with only a simple attachment!

Not only will it function perfectly as a power scythe — and again with only a simple attachment!

BUT—it will also actually chop and mix into your top soil with ease—any cover crop, manure, mulch, plant or animal waste! It will even knock down, chew up and mix cornstalks into your soil!

In other words, you can now do your composting BY MACHINE right in your garden itself! You can do away forever with the back-breaking work of ordinary composting—with all the hauling, turning and watering which has always been necessary!

With this machine you can easily mix so much organic matter and humus into your soil that you can practically do away with using hard-to-get, expensive barnyard manure!

You'll be simply amazed at our low prices! And there is absolutely no other machine at any price which will do the work of power composting which this machine will do!

We can't begin to tell you all about our new machine—how it works—how to use it—all that it can mean to you—details on the attachments, prices, etc. So, we want to send you FREE a copy of POWER GARDENING *and* POWER COMPOSTING.

This fine, well-illustrated book, written by Ed Robinson, author of the famous "Have-More" Plan, will give you the whole exciting story. We will gladly send you a copy FREE—we're so sure you'll want one of our machines as soon as you read it!

Write For This Book Today!

FREE! **Send coupon for FREE BOOK about this wonderful new machine right now!**

ONCE OVER and seedbed is ready to plant! Model T mills ground 16" wide and 7" deep. Plows and harrows in one operation. Low in cost, too!

"BEST POWER MOWER BUILT" — users say. No overhanging wheels—no untrimmed edges! Attachment follows contour of land perfectly!

UNEXCELLED FIELD MOWING —Nothing else like it for cutting hay, tall weeds and trash; does not clog in heavy growth. Unbelievably low in price.

YEAR - 'ROUND HELPER! — Model T converts to snowplow in 5 minutes. Other low - cost attachments: power saw, power cart, etc.

ROTO-ETTE
Reg U S Pat Off

ROTOTILLER, Inc.
Dept. 91
Troy, New York

Please send me FREE by return mail a copy of POWER GARDENING and POWER COMPOSTING by Ed Robinson.

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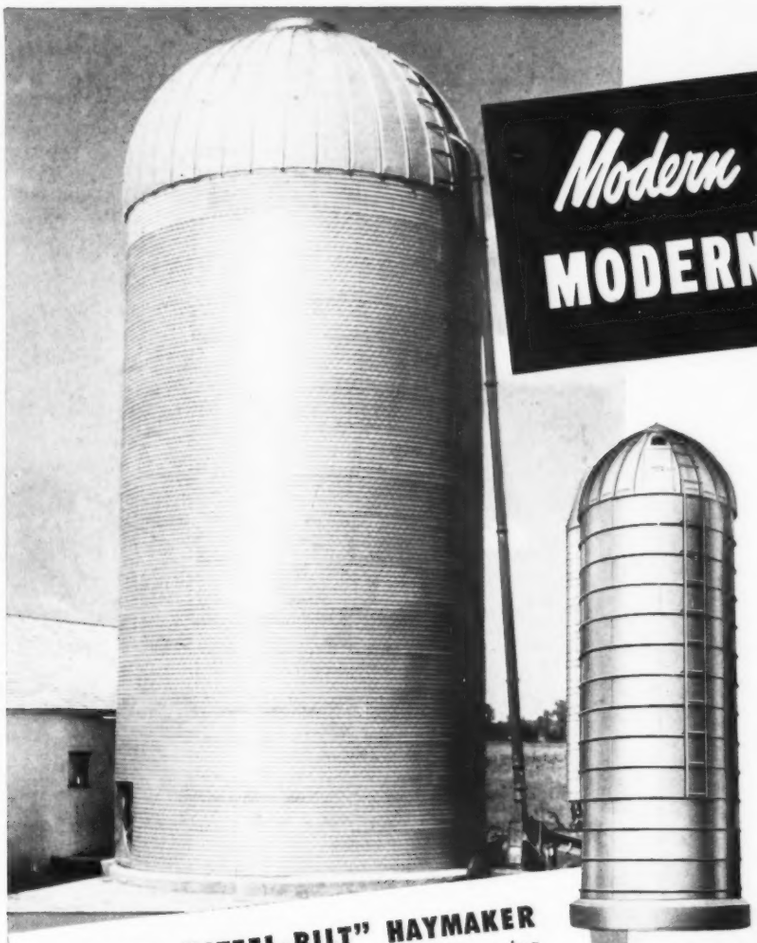
Modern Farm Buildings fo
MODERN FARM OPERATIO



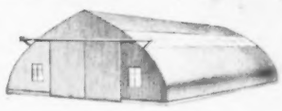
As in any other production operation, efficien
farm is controlled by three principal factors–
equipment, methods and practices, and plant
Today's modern farmers are utilizing the mo
date equipment and are following the lates
mended practices in crop and stock produc
the most part, however, they are not obtaini
mum efficiency and results because they are
in an obsolete plant—the farm buildings are o
and do not conform to the needs of modern e
and methods. Martin Farm Buildings are de
meet this need for a modern farm plant.
designed to meet efficiently the purpose for
tended—to eliminate crop losses and waste

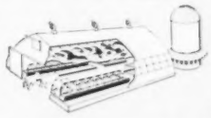
MARTIN "STEEL-BILT" SILO

Assures the finest quality grass or corn silag
loss from spoilage or freezing. Withstands
pressures of grass silage. Modern design, all
struction for a lifetime of efficient use.

MARTIN "STEEL-BILT" HAYMAKER

The only structure exclusively designed for curing chopped hay. The full benefits of field chopping cannot be enjoyed unless the hay can be handled while of sufficiently high moisture that the leaves will not be lost in handling. Forced air curing of freshly cut, high moisture hay in the Martin Haymaker, assures pasture-fresh green hay for year around feeding. Eliminate weather worries in haymaking by the modern method which eliminates the need for field curing.





PROTECT VALUABLE STOC
EQUIPMENT WITH LOW-C
FIRE-PROOF, PERMANENT

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constant jeopardy when sta
moded fire-traps. Martin o
types of modern, all-steel,
buildings each of which is
for cattle or stock housing,
storage, work shop or o
shelter and housing require**

SAFE STORAGE PERMITS MODERN GRAIN HARVESTING METHODS

Good soil preparation and fertilization practices, high yielding seeds and mechanical harvesting equipment have caused a new storage problem for corn and small grains—that of high moisture at time of harvest. Martin grain storage buildings are designed to handle this moisture problem by incorporating scientific ventilating principles. Whether of low, medium or high moisture content, there is a Martin Building and Method to do the job.

Martin Slat Crib for ear corn and small grains.

Two Slat Cribs joined by driveway for equipment storage or feed room.

Martin Corn and Grain Elevator for ear corn and small grains.

Martin High Round Crib for storage of large volume, high moisture ear corn.

Martin Circular Bin for small grain and shelled corn.

STEEL MARTIN Farm Buildings -BILT

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What makes MM Modern Machines *and* Tractors *Weather-wise?*

ECONOMICAL and DEPENDABLE Operation Under a Wide Variety of Field and Weather Conditions!

When field working time is shortened because of bad weather, MM MODERN MACHINES and power can be depended upon to do more in less time when conditions are right. Farmers keep costs down and provide the food and fibre upon which our world depends by turning to modern MM machinery. Many a crop has been saved by modern machinery.

MM HI-KLEARANCE PLOWS do good work at higher speeds with good trash coverage, often even when long straw is wet. To prevent clogging there is 23½-inch clearance between sharepoint and beam . . . 26½-inches between sharepoints on 16-inch bottoms . . . 7 to 10-inch lift.

MM TK "TUMBLEBUG" PLOWS, the original two-way plow with automatic leveling, turns all furrows one way. Ideal for irrigated fields, hillsides and terracing, this plow is easy handling, pulls light . . . turns as part of tractor.

MM DISC HARROWS are built for heavy-duty work, yet they're light in weight and easy to handle with good clearance to prevent clogging. A size and type for every need—regular MM harrows penetrate evenly on turns, too.

MM WHEATLAND DISC PLOWS the original "one-way" plows for longer life, better mixing of the stubble and soil with smooth penetration. They're ideal for conservation work because the stubble left protruding through the surface of the ground prevents both water and wind erosion . . . stubble holds any snow that falls for moisture.

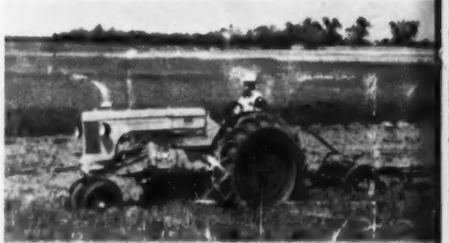
MM UNI-TILLERS may be used for tilling, seeding or cultivating the soil. Can be equipped with middlebreakers, listing plows, regular plows, planters, seeding and damming attachments. Just right for work in vineyards, orchards, contour farming and all soil conservation practices.

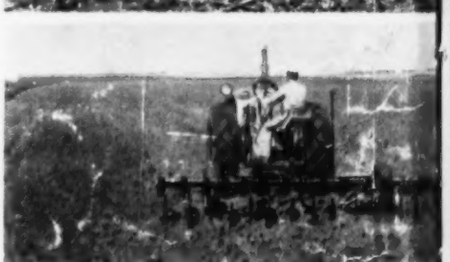
MM MONITOR DRILLS put in crops efficiently at uniform depths with accurate distribution of the seed from corn to flax without use of attachments. Fluted or double-run feeds. Single or double disc openers built to cut through trash better and to plant the seed in moist firm soil for faster germination.

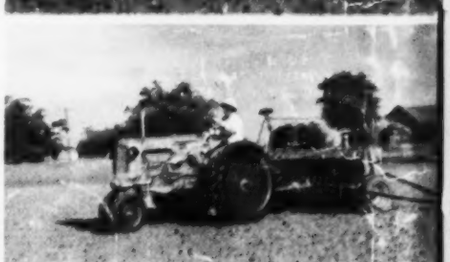
MM TF CULTIVATORS have their ground working tools mounted on two rigid bars to assure deep and even penetration. This feature keeps teeth firmly in line.

MM VISIONLINED TRACTORS are engineered and built to provide dependable, economical power on all farm jobs for more years. Quality MM VISIONLINED TRACTORS, like all MM Modern Machines, *are ready to do the job right, on time, every time.*

Ask your MM Dealer for complete facts on these and other MM MODERN MACHINES, VISIONLINED TRACTORS and POWER UNITS. Also ask him when he will show the new MM movies, "Weather Whys" and "An American Journey."







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